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PREFACE

The lectures constituting this second volume were delivered in Houston Hall during the academic year of 1914-1915. Those members of the several faculties of the University who participated in the course of Free Public Lectures have cordially assented to this early publication of their contributions in order to meet the requests of the many auditors who wished that these addresses might be placed in the same permanent form as the corresponding lectures for the year 1913-1914.

The authorities of the University, desirous of serving as large a constituency as possible, submit therefore this volume with the hope that the messages contained in its pages may prove helpful to all who read them.

HOW PROGRESS CAUSES SOCIAL PROBLEMS

By Carl Kelsey

Professor of Sociology, University of Pennsylvania

There is a very widespread popular belief that civilization means not merely the improvement in methods of life in an increase in the material bases of comfort, but also the gradual reduction of the problems of misery, crime and vice. So general is this belief that if those present today were to be asked, "Would you prefer to live where crime, vice, poverty are unknown, where taxes are low, or where taxes are high and vice and misery common?" most would choose the former. Yet, if we were to make that decision and seek for the place where you might live under such conditions, you would discover that it involved the leaving of Philadelphia and our own beloved state and country to lead the life of a hermit in some Utopia, or share the meager joys of some primitive people.

It is my purpose this afternoon to show you as best I can that our problems grow larger, not smaller, as civilization advances; that progress, in other words, involves difficulties.

The most important things in one's life are the common things. Man's greatest interests naturally center in shelter, fuel, clothing, food, including its production, storage and distribution; the family, education, relation to other human beings, our common institutions. As the result of the influences surrounding us, particularly in youth, we all develop standards of life, which standards we seek to maintain or to raise when we become individual workers.

It is a far cry from the savage of the woods matching his own wit and muscle against other animals, as often hunting as hunted, ignorant of the use of fire, knowing no tools—an animal among other animals to the civilized man of today. We may sum up this wonderful advance in one phrase—an increasing

control of nature. By this I do not mean the overcoming of nature, but the directing thereof for our purposes. The old Roman poet well caught the course of human evolution when he sang:

> Man's earliest arms were fingers, teeth and nails,
> And stones and fragments from the branching woods;
> Then copper next, and last, as latest traced,
> The tyrant, iron.

We have passed beyond the era of stone, the bow and arrow, and it is not too much to say that the most important material bases of our civilization are coal and iron. Tomorrow, perhaps, we shall make electricity our greatest servant. At some more distant time, man may depend chiefly upon the rays of the sun or the ebb and flow of the tides. From this aspect, then, one of man's greatest accomplishments has been the invention of machinery, which so marvelously extends his powers in time and space.

From another viewpoint, we may say that civilization depends upon the creation of an artificial supply of food and clothing. The possession of such a supply, permanent and adequate, is one of the first essentials for any real development. When one must rely upon the food gotten today to meet the needs of the day, and must tomorrow run the risk of not being successful in the hunt, there is little time for the specialization of effort which leads to discovery and invention. When man works as in Africa, where physical conditions practically render the storage of food impossible, he develops neither habits of thrift nor philosophy of saving. Thanks to the development of our commerce and our knowledge of the world, we draw today our food supplies from every climate. It is probably not too much to claim that never before has the human race as a whole been so well clothed and fed.

Another might say that the index of civilization lay in our increasing knowledge of our relations to other forms of life, both animal and vegetable, particularly in the discovery that some of these are causes of our chief diseases. Just this week

Flexner has announced that he has discovered the cause of infantile paralysis. With the knowledge of the specific organism responsible for this dread malady arises the hope that as we get information about its life history, we shall be enabled to overcome its evil effects. To most of us the fact that a few dogs, cats and various forms of vermin have been sacrificed to make possible these great medical discoveries, is a matter of rejoicing, for otherwise observation on sick humans, or even practical experimentation, such as Jenner carried on when he showed the value of vaccination against smallpox, would have been necessary. All these changes in our achievements have caused changes in our standard of living. We demand a far different type of clothing from that which satisfied our ancestors. Pins of thorns have yielded place to buttons and all sorts of mysterious fastenings. We are no longer satisfied with the flickering light of the pine knot, and the one-horse shay is consigned to oblivion where the automobile is available. There is an old saying that the more one has the more one wants. That is sometimes true; it depends upon what it is that one has; but it is never all the truth. It is equally true that what other people have and enjoy in our presence enlarges our wants. It is by no means certain that our power of earning has sufficiently increased to satisfy these wants. The higher standards of civilization require a higher standard of production as well as of income. Our present standards of cleanliness require larger investments than our ancestors found necessary. Civilization presents, therefore, through the contrast between those who have and those who have not, whatever the reason, an increasing temptation to steal or to acquire goods in some other way than by honest work or purpose. It is not accidental, then, that crimes on persons tend to decrease while crimes involving property tend to increase with the growth of a people. Mere increase in property, then, makes necessary a readjustment of our social institutions. He who has no wealth to guard is often far freer in his movements, is restrained by far less sense of responsibility than is the possessor of wealth. If wealth

itself, then, is a source of anxiety, what of the other things that have been mentioned as indicating an advancing civilization?

Even science may have its drawbacks. Advancing medical skill has lengthened the average of life in the last two hundred years. If, however, our advancing medical skill enables us to keep alive great groups of defectives and we even permit them to reproduce, it has brought a curse upon us instead of lessening it. If it enables mothers to survive the pangs of childbirth, who under an earlier régime would have died, though it has saved their lives, which is desirable, it has also facilitated the increase of population, which is often most undesirable.

Power machinery has been suggested as one of man's greatest possessions, but it may become a Frankenstein monster. The railroad may carry our wares and our foodstuffs from one end of the country to the other, or save us the toil and discomfort incident to long journeys, or it may transport instruments of destruction to enable man to attack other men. The God of Battles may rejoice in the slaughter of men; the suffering from starvation of the women, the aged, and children; the destruction of homes and society which is now taking place in Europe, but the God of Love must deem it a return to the beast.

Can any drawback be found, even in control of food and clothing? Even here the record is not so clear as one might think. Aside from the degeneration which comes from overeating, a thing not unknown in civilized communities, there is overindulgence in various substances, such as alcohol, whose results are terrific. The demand for new styles in clothing may lead to the most wasteful extravagances. Whatever man does, then, it appears that there are certain results, expected or unexpected, which do not turn out to his advantage. To make this point more clear, we may roughly outline a series of changes which we frequently sum up, particularly in connection with England, in the phrase "industrial revolution."

In the older time, each household was a sort of a world in itself. It dwelt separate from others in the fields, as do our farmers of today, or with a few other households in some little

settlement; the groups not made up merely of the father, mother and children, but several generations dwelling together, and the group was further enlarged by relatives or friends. Through the joint labors of the members of these groups, raw material was produced and to a large extent turned into final form. Thus, in Pennsylvania, one hundred years ago, many households spent long winter evenings industriously separating the lint from the cotton seed in order that the lint might afterwards be turned into rough clothing. Now, in this household the children were trained in the common things which I have called the important things of life, and the family was the teacher. The children got not merely some knowledge of the technique, but what is perhaps of even greater value—an appreciation of the spirit and purpose of the technique. They came to see that the things produced were for use and that their enjoyment of the things in their final form was enhanced by the share they had taken in their creation.

The steam engine appears on the scene. The separate households and villages disappear and the prople are drawn to the great manufacturing center that power may be advantageously used. The small workshop becomes a factory; the worker becomes a hand; the master worker becomes boss, president, capitalist; the hamlet becomes the great city. The production of material goods increases enormously; the increase in material wealth is almost beyond words. Does it follow that the changes are all to the good, or did they lead to some new and serious problems?

I suspect that the home and family have suffered greatly. To begin with, the removal of the father's contact with his children for so much of the time is unfortunate, to say the least, and this loss is not met and cannot be met fully by the development of the school. It is exceedingly hard to create an atmosphere of home in city tenement houses. More and more one is forced into contact, not with those whose interests and characters are well known, but with those who are practical strangers. Young girls as well as young men seek their pleasures

outside of the home, and the increase in the dangers encountered, particularly when they go into strange cities to work, are too familiar to need more than mention. Moreover, the move to the city breaks the connections ofttimes with friends and the old social agencies. In such things, it seems to me, lie the problems of the family, not in divorce. Today, with our power and freedom of movement, one may live and work here, tomorrow in New York, a week hence in San Francisco.

Under the old régime, the apprentice worked with the master, lived with the master's family, perhaps married the master's daughter, and became in time the master himself. Now the child entering into industry enters a dead-end profession in the main, which makes no particular appeal to his emotions. He no longer sees the whole process of production from the creation of the raw material to its final form in finished goods. As he grows older, he becomes the hand, not the creator. He finds a great gulf fixed between the working and directing groups, and as on the railroads, discovers that he has infinitely greater chance of being killed than of becoming an official. The old sharing of returns is replaced by wages, with whose determination he has little to do save to accept or to refuse. The interests of employer and employee seem to diverge, the old personal bonds are lost, antagonism replaces co-operation, and the vast problems of labor and capital arise. I have no time to enter into this vast field today, but I cannot forbear saying that I see in the audience one who for many years was known as a great employer of labor. I chance to know that he preserves as one of his prized possessions today a mere slip of paper on which the workmen expressed their feelings of personal friendship and gratitude to him when he gave up his connection with the industry. What he did must in some way be done by all. We must cease to think of industry and warfare, and demand that it be conducted in some form as co-operation.

It appears, then, that we act first and think afterwards. Through our inventions we create a new machine, through

our discoveries we develop some new asset. As we begin to use these newer achievements changes in our standards follow. It is not correct, then, to say that changes in standard precede change in possibilities. Some of the results of these changes are those that we desire to produce; some of them are certain to be unexpected, unforeseen, undesirable in their influence upon us.

More or less clearly this fact has been appreciated, and opposition to all change has arisen. We may roughly divide men into two groups, conservative and radical. We must not forget that a man may be conservative in some things and radical in others, so this division is merely for purposes of discussion. The conservative sees the good in the established order, he sees the upset change will make; he is satisfied with things as they are, probably is prosperous, hence he tends to overemphasize the desirability of maintaining existing conditions. The radical may have nothing to lose, everything to gain by some great change. He sees the possibilities of the new system; he does not value highly that which is, hence he is inclined to overemphasize the desirability of change.

Now, both these men are right; both are wrong. Middle ground can be found. Without change there can be no progress, no reaching of higher levels. Yet that which is has value, inasmuch as it is the result of past conditions and experience. So we must manage to conserve not the methods of the old, but its conserving power, its ideals, as far as possible. Change makes necessary not merely new processes in art and science, but new ideals and standards. It is good to be able to read, but what avails it if the reading done is of the sort that undermines moral standards? With ability to read must come a standard of good reading or the end may be worse than the beginning.

Change, ceaseless change, is just as necessary in the human world as in the physical. This should warn us to beware of the panaceas so often proposed as final solutions of all ills. The new programs can only result from experience; they cannot

be outlined in advance. That which can be done, however, is to take all possible precautions to eliminate the evil results.

I began by indicating the growth of problems with civilization. I have tried to show why this is true. In closing, may I express my own faith in the possibility of human achievement? Just as we have conquered the dangerous beasts of the outer world, so may we hope to conquer pride, selfishness, thoughtlessness, the low ideals which hinder the coming of the day of justice, as the Socialist says, or the Kingdom of God on earth, to use the phrase of the religious leader.

In comparison with the physical sciences, the social sciences are crude and inaccurate. Our studies have enabled us rather to find out what is not known than to increase greatly our actual knowledge. As time passes, more accurate methods of observation regarding data will replace our crude guesses. Of one thing I am sure, we have gone far enough in our study of society to appreciate the necessity of developing a new ideal and greater recognition of our contact with other men, our dependence on other men and their influences on us. The demands made by this new recognition cannot be met by any payment of money, but rather by a clear facing of changed conditions and the development of wise policies which enables us to advance our standards.

One of our poets has phrased this idea in what seems to be happy fashion:

I gave a beggar from my little store of hard-earned gold;
He spent the shining ore, and came again and yet again,
And cold and hungry as before.
I gave a thought, and through that thought of mine he found himself—
The man supreme, divine, fed, clothed and crowned with blessings manifold—
And now he begs no more.

THE AMERICAN STYLE OF ARCHITECTURE

By Warren P. Laird

Professor of Architecture, University of Pennsylvania

I take refuge in the quotation marks with which, in the published announcement, my topic is embellished, by at once disclaiming any intention to assert that this country has its own style of architecture. Rather should the subject be proposed as an inquiry under the caption "An American Style of Architecture—Is It Inevitable or Is It Impossible?"

This is a question often propounded to the architect, and its answer is not easy. But American ambition would answer it easily, in the affirmative. Indeed, does not the average citizen believe in his heart that we may do anything that has been done in the past, and do it better? Why not then create for ourselves a new architecture, as fine in its way as any of our achievements in commerce or industry, invention or warfare? It would seem a poor patriotism that would deny so reasonable a proposal.

Let us examine into this ambition and see whether it be reasonable. To do so profitably it will be well to start with a definition of the essentials of our inquiry—the terms "Architecture" and "Style." To have clearly before us the nature of one and the limitations of the other will put the function of prophecy, if we are to prophesy, squarely upon its two feet.

First, what is "Style"? I can do not better than to here quote the definition given by Hamlin in his "History of Architecture":

"Style is a quality; the 'historic styles' are phases of development. Style is character expressive of definite conceptions, as of grandeur, gaiety or solemnity. An historic style is the particular phase, the characteristic manner of design, which prevails at a given time and place. It is not the result

of mere accident or caprice, but of intellectual, moral, social, religious and even political conditions. Gothic architecture could never have been invented by the Greeks, nor could the Egyptian styles have grown up in Italy. Each style is based upon some fundamental principle springing from its surrounding civilization, which undergoes successive developments until it either reaches perfection or its possibilities are exhausted, after which a period of decline usually sets in. This is followed either by a reaction and the introduction of some radically new principle leading to the evolution of a new style, or by the final decay and extinction of the civilization and its replacement by some younger and more virile element. Thus the history of architecture appears as a connected chain of causes and effects succeeding each other without break, each style growing out of that which preceded it, or springing out of the fecundating contact of a higher with a lower civilization. To study architectural styles is therefore to study a branch of the history of civilization.

"Technically, architectural styles are identified by the means they employ to cover enclosed spaces, by the characteristic forms of the supports and other members (piers, columns, arches, mouldings, traceries, etc.) and by their decoration. The plan should receive special attention, since it shows the arrangement of the points of support, and hence the nature of the structural design. A comparison, for example, of the plans of the Hypostyle Hall at Karnak and of the Basilica of Constantine shows at once a radical difference in constructive principle between the two edifices, and hence a difference of style."

To the definition of architecture I beg to give much more extended attention. It has been described in many ways, but our consideration of them may well be prefaced by a negative definition; viz., architecture does not consist of the surface appearance of building whether outside or in, of the color and ornamentation of structure, or even of its graces of line and proportion. This is but its superficial aspect and only part of

its story. The whole story—that quality which gives to a structure its right to be called a work of architecture—lies quite as much in the internal arrangement or disposition of its parts and the integrity or soundness of its construction.

A ship may achieve grace of line and in her decorations a real beauty of color and ornament, yet these do not make her a work of marine architecture. Rather are they the last and least essential of her virtues as a well-designed ship. So with coach building or the production of any fabric combining utility with beauty, the latter is but an outgrowth of the former, a flowering out, as it were, of the forces within.

Under this conception of the art its definitions take on greater breadth of meaning. These are various.

Perhaps the simplest is that architecture is the art of fine or beautiful building. An ancient writer tells us that "Architecture hath three properties, Stability, Convenience, Beauty," while Viollet-le-Duc extends definition into analysis by saying that "Architecture, the art of building, includes two elements, theory and practice. The former comprehends the fine art side proper, the body of general rules inspired by taste and based on tradition, and the science, which admits of demonstration by means of invariable and absolute formulas. Practice is the application of theory to particular needs; it is practice which causes the art and the science to conform to the nature of materials, to climate, to the customs of a period or to the necessities of the occasion."

These and other definitions always recognize architecture in its twofold nature of an art dedicated to use, or showing the combination of utility and beauty. And always they give to this art an exalted place among the products of human genius.

I am tempted to quote Vitruvius, the Roman architect who, in the dedication of his writing to Cæsar, presents a high ideal of architecture in his prescription of the human accomplishments necessary to its production.

"Architecture," he says, "is a science arising out of many other sciences, and adorned with much and varied learning, by

the help of which a judgment is formed of those works which are the result of other arts. Practice and theory are its parents. . . . An architect should be ingenious and apt in the acquisition of knowledge. . . . He should be a good writer, a skilful draftsman, versed in geometry and topics, expert at figures, acquainted with history, informed on the principles of natural and moral philosophy, somewhat of a musician, not ignorant of the sciences both of law and physics, nor of the motions, laws and relations to each other of the heavenly bodies."

These brief specifications may well be amplified by an examination into the nature of architecture in aid of a better understanding of its American phases, and to this purpose I shall devote a considerable portion of my paper.

What then is this art, universally admitted to be one of the supreme manifestations of civilization? Is it a something applied to buildings as paint was brushed upon canvas to produce the masterpieces of Raphael? Or does it go deeper into the structure, even as the art of the violinist is built upon and felt through every sound that comes from the magic of his fingers? In other words, is it not an art inseparable from every stone that enters into the fabric?

Upon the answer to this question depends the ranking of architecture, whether it is to be put among the fine arts or the industries, whether it is to be regarded as a thing profound or superficial, a medium for the noblest human genius or a mere instrument for the play of fancy.

To meet the question let us examine into the three fundamentals of architecture—stability, utility, beauty.

The first of these is of its very essence, for the true work of architecture must endure. An ephemeral creation, such as a stage property, belongs to other arts, but the fabric which has endured through ages of change and decay takes on a quality of dignity and power which makes it, within human limitations, akin to the mighty fabric of nature—the work of the Architect of the Universe. We cannot conceive of true architecture

without stability or endurance, and we are profoundly impressed by its presence in all great monuments, whether or not we analyze the reason.

This, of course, lies in the effort to so construct the building that it shall resist the elements, withstand disintegration under fire and earthquake and endure the severities both of use and abuse. Architecture is not alone an art, but the art of building; an art whose purpose is not merely to achieve beauty, but to insure its permanency. Hence it requires the assembling together of suitable building materials into forms of strength, each fitted to its special purpose. This aspect of the architect's work is intensely practical, for in it he is dealing with material elements—stone, wood, steel, brick; things of gross weight and of great, although circumscribed, strength.

While this is obvious in the simple yet majestic architecture of Egypt, it is perhaps most strikingly illustrated in the apparently perilous constructions of Roman vaulting, the domes of the Renaissance or the stone ceilings of Gothic times. In these structures every ounce of the countless tons of suspended material must be supported, their crushing power resisted and their pressures, tending to rupture, taken up and carried, by carefully adjusted counter-loading, safely into the foundations. Cold, hard fact is here observed at every point, yet the structure was conceived in the love of beauty and attains it in every line. Thus, without conflict, sentiment is master and science serves. Yet science or practicability or honest construction, by whatever name it be known, is vital to that final quality which we call "beauty" because, if the construction be inadequate or a sham, the building can have neither present dignity nor long life.

Also this quality of stability gives to a building a certain element of character which, while seeming to be independent of construction on the one hand and abstract beauty on the other, is yet the fruit of their union, a quality which may be called the expression of power in architecture. This we feel in any of the truly noble monuments of the art, not only in the gigantic

strength of Karnak, but in the daring yet certain thrust and counter thrust of a Gothic fabric.

The second property, called "utility" or "convenience," while no less essential, seems usually to be overlooked in the popular conception of architecture, but the architectural student is taught in paragraph one of his first chapter that he can never produce a work of real architecture in which this quality is slighted.

For to serve its practical purpose is so obvious a virtue of the building that we are apt to overlook it as an attribute of that half mysterious and vaguely admired thing called "architecture."

Yet would any of the admittedly great examples of this art be so regarded if they were false to this principle? Try to imagine the baths of Caracalla, in their vast yet simple scheme, serving any other purpose than that for which they were so well planned; or Rheims Cathedral in its almost divinely inspired fitness for worship having been actually intended as a fortress; or the Taj Mahal, in its dream-like beauty, destined by its builders to be a caravansary! Each of these masterpieces was carefully arranged to serve a given purpose; the practical requirements imposed by this purpose primarily influenced the form of the building, both in its parts and their assemblage into the whole, and this form, noble though it be as a picture, could not have been first conceived as a picture solely to produce that external form and with the hope that somehow it might be found fitted to its practical purposes. The process is exactly the reverse, beginning as it must with a consideration of practical purposes, and the genius of the architect lies in producing a building which, meeting these purposes with the greatest convenience and the most economical construction, has also achieved the attributes of beauty.

This quality of convenience, or "good planning" as it is called, is not the product of mere invention or mechanical skill exercised independently of the architect's other acts and subordinate to them, for upon it depends the whole structural and

artistic success of the final result. In the beginning when, in the mind of the architect, the building is yet without form and void, its construction is already predestined, for the elements which will enclose or separate its spaces are few and well known—the wall and the roof, pier and column, arch and vault, beam and truss. But the shape and relations of the rooms and other enclosed spaces and the form of their assembled mass is unknown and must be discovered. The working out of this problem involves both the interior and the exterior of the building considered as a single conception to which each part is essential and in which all are interdependent. To perfect this single conception requires the shaping of each part and the grouping of all into a unified whole, each apartment and thoroughfare and other space being so formed as to meet its individual requirements and so related to each other part that all will serve one central purpose. In other words, it is the creating of one organism with many functions.

In the designing of any building this is the architect's chief labor, yet it is most apt to be overlooked in a judgment of his work. Thus the content or internal organism of a structure may be disregarded quite as are those of the plant or animal form whose external characteristics attract our attention to the exclusion of the organism which they protect and upon which they depend for their very existence. This attitude of mind, as we examine a work of architecture externally and internally, results in our seeing only its striking features or surface characteristics and prevents a grasp of the relation of parts and of the fact that the external form is but an expression of internal function. If then we seek to understand the organism of the building we shall better appreciate its quality as a work of art. A further aid to this appreciation is a knowledge of the difficulties and limitations under which the architect has labored. Upon reflection we realize that he has been restricted as to cost, the peculiarities of the site and climate and perchance of the client as well; he can use only those structural forms of known stability and economy and has not a wide range of

choice in the selection of materials either as to their practical or æsthetic properties. Under these conditions he must produce a building which will meet, with the greatest possible utility, the practical uses for which it is intended.

These demands on the one hand and restrictions on the other would seem to afford an ample test of the architect's creative ability. But his dilemma has more than two horns, for he must also achieve beauty. This he cannot secure by the mere addition of ornament, after the rest of the problem is solved, for beauty must be wrought into the very structure of the building. Every part and the grouping of all must be conceived with regard to it.

And right here enters a factor essential to the highest architectural quality—that of consistency of form to purpose. This, in the study of the design, requires careful attention, not alone to the actual form of the parts, but to their shape, size, equipment and position as demanded by the uses which they will serve. To meet these requirements will yield good proportion in respect to the use of the building, and this is one of the prime virtues of good architecture, for a building may have perfect harmony of form in an æsthetic sense, but bad proportion in respect to its uses. It thus shows good decorative but bad plan composition.

Thus the architect works out the whole internal economy of the structure into an organism not only practical in purpose, but of such character that it can be naturally expressed in terms of beauty. This second quality of architecture we may call its logic.

The cause of beauty, the third fundamental, requires no pleading, for it is universally felt to be essential. Indeed, it seems to be regarded as the very essence of the art; not merely the Hamlet of the play, without which all its meaning is gone, but the very play itself. This impression exists perhaps because pure beauty, having so much to do with the external aspects of a building, is the most obvious or strikingly evident thing about it.

It is hardly possible at this time to exploit the question of what constitutes absolute or pure beauty in a structure, but we may consider at least one point of interest. Architecture, like the arts of painting and poetry, has its grammar, its own limitations of action, its mode of expression. And these factors in each of these arts compel observance at the penalty of failure, no work of art being successful if it be not at least correct. But if it stop here, it is but partially successful and stands on the lower plane of the commonplace. It may have grammar without style, style without grace or charm, charm without the higher spiritual significance of great art.

To return then to the general consideration of beauty, we may say that in its pure or abstract form it is only one of the phases of this aspect of architecture. Yielding, as it does, graces of lines and harmonies of form and color, it is responsible for much of the charm which attracts us, but it does not reveal the deeper qualities, the nobler undertones of the symphony. These lie in the significance of the building, in its expression of purpose and the underlying proportions which control the destiny of the fabric and determine its real value as a work of art. These qualities are to be found in the general nature of the structure, in what we may call its anatomy, in the way it is organized and constructed, in its "power" and "logic."

The expression of these qualities or their outward manifestation may be regarded as giving the building the character commonly known as beauty. This will consist in the expression of two things: the first, of the functions of the building; the second, of its sentiment. Under the latter head we may group such attributes as harmony of form and color, purity of line, appropriateness of ornament and the intangible something which gives the building its sentiment. But the expression of function is also necessary; that is to say, the outward evidence of the internal organism. This should be such that the building easily and naturally declares itself to the observer, making clear its purpose; in short, telling its story. This is done by a frank recognition of internal arrangements; by emphasizing

structural lines rather than ignoring or concealing them. The sum total of these qualities is shown by the character of the building. This in all great work is, first of all, one of sincerity. With this there may be found dignity or playfulness, religious feeling or intellectual calm, the assertion of power and authority or the evidence of purely commercial or domestic uses. And the character and sentiment of a building is its highest beauty, the final flowering of the forces that have produced it. The element of beauty, therefore, is something more than skin deep, something not to be produced by a treatment of surfaces; on the contrary, it has root in every consideration vital to the building.

These three qualities then—stability, convenience and beauty—must characterize a building before it can be regarded as truly a work of architecture, and in our examination of American examples we must bear them in mind.

Our definitions of "style" demand more than surface characteristics as a basis of identification. To be Gothic the structure must present more than the pointed arch or the ball flower, and we may not call a building Greek because its columns recall the age of Pericles. No, the thing called "style," being based upon principles of construction and planning as well as characteristic decorative treatment, and further being an unconscious product of its own age, place and race, is a quality profoundly significant of the whole character of the architecture of a given period. Thus, passing in brief review the great divisions of architectural history, we find their notable examples differing in plan and construction as well as in adornment. Each reflects a peculiar civilization, with distinctive sociological conditions, habits and customs, religion, form of government and restrictions of climate and building materials.

Now the definitions as applied to our specific inquiry will require that the architecture of the United States show certain qualities, if it is to be called a "style" of architecture, to wit: first, a character peculiar to this country and expressive of its

civilization as distinct from that of other countries; second, fidelity to the principles underlying architecture as an art.

This leads us to the second and final division of our inquiry—the state of the art in this country. In brief outline its development falls into four periods, which can be approximately fixed as follows: the "Colonial" of the seventeenth and eighteenth centuries, the Classic and other revivals of the first half of the nineteenth century, a darkened and nameless interval ended by the Centennial Exposition, and the epoch familiar to the present generation.

So-called "Colonial" architecture is of course a direct transcript of English work of the reigns of Anne and the first two Georges, a transcript as faithful to the original as the limited resources, differing materials and lack of trained architects in a new country would permit. During this period public buildings were few and comparatively small, affording no opportunity for truly monumental treatment, and it is in homes and churches that we find the really characteristic evidence of the trend of the times. These were directly and powerfully influenced by the domestic work of Georgian England, and the churches designed by Wren and Gibb. These are best adapted to execution in stone, but as wood and brick were virtually forced on the colonists by their relative poverty and primitive resources, the original models were of necessity modified when executed in a material for which they were not designed. For the most part these changes were effected with good taste and resulted in a new phase of Georgian, peculiar to this country and with its own charm and distinctive character. These qualities prevail among the several quite distinct groupings of Colonial work, whether that of New England with its predominance of wood or of the Old Dominion in its free employment of brick. In the middle colonies the sway of English influence was not so complete, for much building was done by Dutch, Swedish and German settlers. Nevertheless, it all reflects the Renaissance style then prevailing throughout Europe, of which the Georgian was but the English version.

Examples of the buildings of the Colonial period carry us to familiar ground whether the subject matter be the dwellings of New England or the manor houses of the South, the churches inspired by Wren or the public buildings of Boston, New York or Philadelphia.

We may well take satisfaction in the quality of this architecture and justly feel pride in the fact that it proves the nation's founders to have been men of spirit and taste and high ideals. But while it is distinctive and peculiar to this country, it is too similar in principle to its English predecessors to constitute a new period in the art of building and too little characteristic of our national life to be the American style of architecture.

Neither can we claim as our own the Spanish Colonial of the late eighteenth century, evidenced at St. Augustine and in the California missions.

Even less so is it possible to designate as a style the succeeding period of revival, the second in our history, for its products were often as literally as possible productions of the monuments which inspired them. Moreover, frequently this similarity was only superficial, the Greek or Roman original supplying only a front behind which was concealed a building wholly dissimilar in plan to its pagan antecedent. Many a classic portico of this period was so perfect a work of archæology that it well might deceive the citizen of Athens or Rome until he had passed beneath its shade into the modern interior of which it was so false an exponent. Nor was the reviving impulse of this period confined to classic forms, for those of the Gothic period, English, French, even Venetian, were called into service. While chiefly employed in churches, this movement showed in other directions; some interesting, as in the old Boston Museum of Fine Arts, and others, because of their domestic character and use of wood, so short of the dignity of the original as to merit the name of "Carpenter Gothic."

The impulse of this second period was similar to that of the first, lying as it did in the admiration of a noble original and the desire to reproduce it, but it was less successful because less

sincere. Colonial architecture required no forcing of construction or plan for the production of a given external effect, but rather made the latter an expression, through natural means, of the former. But the period which followed was a revival of externals too often for their own sake, regardless of their logical relation to the plan and frequently in contradiction to it. Its absence of sincerity and fine quality reminds us that Dickens' visit to America during this period was followed by the creation of that monumental architectural fraud, Mr. Pecksniff. This period, while more ambitious, is less admirable than that which preceded it, and we could not, if we would, upon any course of reasoning, call its product the American Style of Architecture. Rather was it the American period of archæological experimentation.

False standards of action naturally lead to a decline of morals, and the state of our architecture for the following quarter century—the War Period—was a case in proof. Well may it be named, after the furniture of its time, the hair-cloth period! Aside from the rather notable exception of church work, its chief buildings rarely displayed a virtue equal even to the archæological merit of their predecessors, and they give us even less to which to attach our label of "the American Style." In explanation of its defects and virtues Hamlin says that this "period from 1850 to 1876 was one of intense political activity and the rapid industrial upheaval of the Civil War, and was marked later by the completion of the Pacific Railroad (1869) and a remarkable development of the mining resources and manufactures of the country. It was a period of feverish commercial activity, but of artistic stagnation, and witnessed the erection of but few buildings of architectural importance. A number of state capitols, city halls and churches of considerable size and cost, but of inferior design, attest the decline of public taste and architectural skill during these years. The huge municipal building at Philadelphia and the still unfinished capitol at Albany are full of errors of planning and detail which twenty-five years of elaboration have failed to correct. Next

to the dome of the capitol at Washington, completed during this period, of which it is the most signal architectural achievement, its most notable monument was the St. Patrick's Cathedral at New York, by Renwick, a Gothic church which, if somewhat cold and mechanical in detail, is a stately and well-considered design. Its west front and spires (completed 1886) are particularly successful. Trinity Church (1843, by Upjohn) and Grace Church (1840, by Renwick), though of earlier date, should be classed with this cathedral as worthy examples of modern Gothic design. Indeed, the churches designed in this style by a few thoroughly trained architects during this period are the most creditable and worthy among its lesser productions. In general, an undiscriminating eclecticism of style prevailed, unregulated by sober taste or technical training. The Federal buildings by Mullett were monuments of perverted design in a heavy and inartistic rendering of French Renaissance motives. The New York Post Office and the State, Army and Navy Department building at Washington are examples of this style."

But the final—the present—period, what of it? Here lies the gist of our question, and its answer, for within the span of a generation has come the awakening to a truer conception of architecture, a better insight into the full depth and quality of its constitution and the willingness to accept and skill to meet the difficulties imposed by that constitution. For the conception of architecture which I have so imperfectly explained in the first part of this paper is accepted by the modern well-trained architect as his guide and precept. He realizes that his building, to be possessed of good architectural quality, must show that quality in the design of its construction and its plan no less than the design of its exterior.

No building today is condemned more promptly by architects and more inevitably by ultimate public judgment than that whose construction is a sham and whose internal arrangement has no relation to its exterior, whatever the abstract or academic correctness of the latter. This wholesome change does not mean that our problem has changed, but that it is being solved

on a better and, we believe, the true principle: that of regarding a building as an organism whose exterior is but the expression of its function. To make this building truly a work of art demands that it shall be designed chiefly from the point of view of the plan. Here centers the architect's responsibility, for if his plan is well composed, if he finds the right *parti* and develops it properly, his construction will show a maximum of stability with the greatest economy of cost, while at the same time the composition of mass and façade, the determination of proportion and line, of decoration, color and texture will grow out of the plan as naturally as the flower grows out of the root. This principle underlies the good architecture of all ages and peoples, and today the best of our work is produced by its aid.

That our generation has seen not only the most considerable but a truly remarkable architectural development is too evident for argument. This development shows certain phases and is due to certain causes. Perhaps the most striking of its phases is the crystallizing of the two distinctive American types of buildings—the country house and the office building. With the latter have emerged constructive methods and devices, notably the steel skeleton and the elevator. The office building originated in the United States, and each is peculiar to our life and customs. Yet they have not so far evolved as to constitute more than perhaps the beginnings of an American style. The office building has not even yet shown a true external expression of its internal organism, although this will undoubtedly come. But to have originated two building types, one a marvel of construction and the other a racially true expression of our country life, argues a long step forward in architectural development and an even longer step is proved when we contemplate the great improvement in quality evident in every class of building, public and private, governmental, religious and commercial.

The cause of the great improvement in American architecture, apart from the opportunities afforded by our enormous growth in material wealth, unquestionably lies in the improved training

of our architects and the growth of public taste. Less than fifty years ago was established the systematic education of the architect in schools as distinct from the apprenticeship method. Today several thousand young men are studying in some forty institutions and in special classes and our best architects are all but wholly those who have had the school training, either here or at the Ecole des Beaux Arts in Paris.

This school training has for its purpose the whole education of the architect as a member of one of the great professions; not alone the development of his faculties as an artist, but the informing and disciplining of his mind through a knowledge of the history of his own and allied arts, of the theory and practice of construction and of the essentials of general education in mathematics and pure science, English and foreign language.

His university life having been a period of artistic discipline and liberal culture, supplemented when possible by foreign travel and study, the American architect of the better and, by virtue of his influence, the dominating type, has carried his professional achievements to a plane of high architectural quality, not excelled by contemporaneous work in any of the mother countries. Equally with the architects of Europe, he is the heir of the past. Perhaps even more than they he has drawn from it because of his fresh eagerness and greater freedom from the thralldom of tradition. Certain is it that the architectural problems created by American conditions of life are being solved upon sound principles of architectural design and with a good taste and freshness of treatment that gives to the best of our architecture not only a distinctly American flavor, but a merit equal to that of the present-day architecture of any other country.

But these facts, remarkable though they be in so young a nation, do not give us a distinctive American style or even its beginnings. The word "style" in architecture means too much; more indeed than any nation has achieved since nations ceased to live in isolation. For centuries past no people have produced a style of architecture in the sense in which that term

is applied to all the great and significant periods in the world's history. Compared to these, the architecture of each of the nations in modern times has but faintly mirrored their characteristics. In this slight degree, and in this only, I believe will the United States develop an individuality. Our architecture has even now its own flavor, a tinge of character which makes it unlike that of contemporaneous work in European countries, but each of the latter also is distinguished from its neighbors by minor characteristics. And these, when compared to those that distinguish the great historic styles of the past, sink into the class of secondary differences which mark the phases of a single style.

For the day is past for the formation of another great architectural epoch. The Oriental races have written and closed their book. Occidental peoples, whether at home or in their colonies, seem to be as one as far as architectural impulse is concerned, evincing national differences in the building art not more striking than those perceptible in their costumes, now so universally similar in character.

No modern nation has shown, or can expect to produce, a new "style"; but the United States, equally with the others, is developing its own distinctive phase of modern architecture, which, by simply being good art, will, we confidently believe, give the patriotic citizen as great cause for pride as if it realized the impossible dream of an American style.

THE RELATION OF BACTERIOLOGY TO THE PROBLEMS OF MODERN LIFE

By D. H. Bergey

Assistant Professor of Bacteriology, University of Pennsylvania

The most important problems of life concern the comfort and well-being of humanity. The greater portion of our labors are directed toward the securing of the means whereby we may be comfortable and at ease and to assist others in attaining a similar estate. The full enjoyment of life is possible only through the possession of good health. In the acquirement of this valuable possession, bacteriology is playing a valuable rôle. The service of the science to humanity is increasing each year, and it is probable that it will be of much greater benefit in the future.

To the minds of most persons the bacteria present themselves as agents of disease which can have no other influence than that of harm to mankind. This conception is, however, far from correct. While many of the diseases of man, of the lower animals and even of plants are caused by bacterial action, the number of species of bacteria which belong in this harmful class is very small as compared with the great number of species in nature which are directly beneficial.

The significance of the bacteria in nature at once becomes apparent through the realization of the fact that all life upon the surface of the globe is dependent upon their activities and that if the bacteria were removed from the earth all other life would sooner or later terminate.

Several groups of bacteria are active in the soil in the decomposition of dead organic matter from the higher complex compounds to the simpler compounds. The operations of these groups of bacteria are essential to the growth and development of the higher plants. Since the animal world is dependent upon

the vegetable world for its food, it is seen that in fact all life on the globe is dependent for its existence upon the activities of the bacteria in the soil.

The food supply of growing crops and of other green plants is derived from the air and the soil. The soil supplies food for plants in the form of ammonia, water and various inorganic salts. Aside from the mineral constituents which compose the tissues of plants, four chemical elements are necessary for their nutrition: these are nitrogen, hydrogen, carbon and oxygen. Of these oxygen and carbon are obtained principally from the air, while nitrogen and hydrogen are derived largely from the soil. The ammonia and the nitrates in the soil supply a large part of the nitrogen and hydrogen requirement of plants, while a much smaller proportion of these elements is supplied from other compounds in the soil.

Growing vegetation requires for its development large quantities of the element carbon, as it is one of the chief constituents of all plant tissues, as cellulose, starch, sugar, gum, etc. A portion of the supply of carbon is derived from the carbon dioxid which results from the tissue oxidations of the animal world, but this supply is not sufficient to meet the demands of growing plants. All dead organisms, animal as well as vegetable, undergo decomposition or decay. This process of decay is brought about by bacteria. The carbon compounds in dead organisms are broken down into carbon dioxid. From this source the growing plants obtain a large part of the carbon required for their development.

The supply of ammonia in the soil is dependent principally upon the activities of the soil bacteria. These bacteria break down or bring about the decay of dead plants and animals and change the complex substances of these dead organisms into the simple compounds of ammonia, carbon dioxid and water, which are again available for plant food. If the activities of the bacteria in the decay of dead material were arrested, the available supply of plant food in the soil would become exhausted. Since the animal world is dependent for its food

upon the plant world, it becomes evident that the continued existence of man is dependent upon the work performed by the soil bacteria in preparing food for plant life.

Bacteriologic analysis of various cultivated soils has shown that those soils which are richest, that is, those on which the most abundant crops are obtained, also contain the greatest number of soil bacteria. The number of bacteria in a particular soil is dependent, however, upon the amount and character of the food which the soil contains on which they can feed. The most important food supply for the bacteria of the soil is dead animal and vegetable tissue, and the scientific agriculturist of today has to learn how best to supply this bacterial food in order to further the activities of the bacteria in the soil.

Although most of the growing plants derive their required supply of nitrogen from ammonia and nitrates in the soil, there is one family of plants, the Leguminosæ, which cannot obtain their nitrogen from these compounds. Notwithstanding the fact that the air consists of about eighty per cent nitrogen, neither plants nor animals can use atmospheric nitrogen directly. The leguminous plants obtain their nitrogen from bacteria that are growing in symbiotic relations in small nodules on their roots, and these bacteria have the power of absorbing atmospheric nitrogen. On this account the leguminous plants are richer in nitrogen than the other plant species and hence they are such valuable sources of food for both man and animals.

The leguminous plants have been employed, from a time beyond the memory of man, as important agricultural crops and they are generally used in rotation with other growing crops. This system of rotation of crops is practiced almost everywhere, but it remained for the science of bacteriology to demonstrate the value of this practice and place it on a satisfactory basis. A soil on which a leguminous crop has been grown is richer in nitrogen than it was before, owing to the storing of atmospheric nitrogen by these plants. The farmer plows down a growing crop of leguminous plants and thereby enhances the nitrogen content of the soil.

The science of bacteriology has made it possible to extend the use of the leguminous plants to a degree heretofore impossible. It has been found that the bacteria living on the roots of a particular leguminous plant are different from those growing on any other species and in order to grow any particular leguminous plant in a soil it is necessary for the appropriate variety of nodule-forming bacteria to be found in the soil. These bacteria are absent from the soil unless the particular leguminous plant had been previously grown in it. It is possible today to isolate the desired bacteria from the root nodules of the plants, cultivate them in the laboratory and subsequently inoculate the soil on which the particular species of leguminous plant is to be grown. The cultivation of these bacteria has become a commercial enterprise and it is a common practice to inoculate soils for the purpose of growing a new species of leguminous plant.

Agriculture has benefited by the discoveries with regard to the relation of the bacteria of the soil to plant nutrition. Besides this, agriculture has also benefited greatly by the discovery that many of the diseases of plants are caused by bacteria and that ways and means have been found of preventing and curing some of these diseases.

All the plants used for food, as well as ornamental and wild plants, are subject to disease. The apple, pear, quince, apricot and plum suffer from blight caused by Bacillus amylovorus. Canteloupes, muskmelons, cucumbers, beets, carrots, cabbage and cauliflower suffer from rot which is caused by several different bacteria. Wilt is another bacterial disease of canteloupes, muskmelons, cucumbers, potatoes, tomatoes and tobacco, due to several kinds of bacteria. These plant diseases can be controlled only by the use of germicides sprayed on the growing plants, by disinfection of the seed and by disinfection of the soil. With the aid of these preventive and curative measures it has been possible to save the agriculturist large sums of money each year.

The older ideas of spontaneous generation of life have been

refuted through the discoveries of Pasteur and his followers, who demonstrated that all life is dependent upon pre-existing life and that there is no spontaneous generation. When it had been definitely proven that organic fluids remained sterile when they had been sterilized by heat and hermetically sealed, it was an easy step to apply this knowledge to the preservation of food on a much larger scale than had been possible heretofore. The great industry of canning food materials of all kinds made enormous strides after it was learned that the views of the older scientists with regard to spontaneous generation were erroneous.

Unfortunately the manufacturers of foods have been seeking for some time to apply knowledge of bacteriology in another way to the problem of food preservation, viz., by adding antiseptic substances to the foods so as to prevent decomposition by the bacteria that may be present.

The use of salicylic acid, boric acid and benzoic acid or the salts formed with sodium are the most common food preservatives employed. As all of these preservatives are more or less harmful in food, the use of such preservatives is prohibited by law or the amounts are limited by statute. The use of the preservatives mentioned and others, such as sulphur dioxid and sulphites, has made it possible for the manufacturer to market inferior foods that would otherwise not be marketed. For this reason it is very important that the use of chemical preservatives should be prohibited in order to protect the unwary from fraud and from harm.

The application of our knowledge of bacteriology to the collection, storing and manufacture of the various dairy products has added much to the comfort and well-being of humanity. The collection of milk in clean receptacles and the storing of milk at a low temperature until used has made it possible to bring this important food product to the consumer over long distances and conserve it in a wholesome state for a longer time than heretofore.

The pasteurization of milk has made it possible to extend the dairy industry into areas far distant from great centers of

population and has been the means of assisting in reducing to a marked degree diseases that had prevailed in urban communities from time immemorial, especially intestinal diseases of infants and typhoid fever.

In the manufacture of butter and cheese our knowledge of bacteriology has been the great factor in the extension of these industries to remote rural districts. The manufacture of butter in the dairy has been a household practice for centuries and until comparatively recent times it has been largely a matter of chance that the final product was of the desired character. The flavor of butter is due to the action of certain bacteria in the souring cream. As formerly no special care was exercised to exclude bacteria that were undesirable, the final product was frequently far from palatable, or of very poor keeping quality.

Through the painstaking investigations of Professor Conn and his associates at the World's Fair at Chicago in 1893, it was found that several species of bacteria could be isolated from butter, which, when allowed to grow in sterilized cream, opened the way to manufacture butter of the finest flavor at all seasons of the year.

The investigations of Metschnikoff upon the cause of the long life of the peasantry of the Balkan States have shown that this is traceable to the use of sour milk as the principal article of diet. The Bulgarian bacillus, which is the chief agent in the preparation of the sour milk, is now a commercial product of the laboratory and may be used in any part of the world to ferment milk. Sour milk and buttermilk are useful adjuncts to the dietary of many persons who are unable to digest whole milk or whose tissues cannot utilize the milk sugar contained in normal milk.

The Malthusian doctrine with regard to the limitation of the increase in population because of insufficient food production has been overthrown through the improved conditions in agricultural practice, through improvements in the production and marketing of dairy products, and in the preservation of food. These results were brought about by the application of bacterio-

logical knowledge. On this account population has increased at a far greater ratio during the past quarter of a century than had been estimated by the earlier economists.

The influence of bacteriology in the preservation and restoration of the health of humanity has been of even greater value than all of the services so far considered. The application of our knowledge of the action of bacteria in the purification of water and sewage has served to safeguard the health of communities where no pure natural water supplies could be obtained or where the method of disposal of human waste would have endangered the health of neighboring communities.

The rapid multiplication of peoples in all parts of the world has rendered most natural water supplies unsafe for domestic use, and where a pure supply is not available it is now possible to make safe, through sand filtration, supplies that are already polluted or prevent the pollution through human waste by the purification of sewage before it is discharged into adjacent bodies of water.

Since the purification of water by sand filtration has been controlled by bacteriological analyses of the effluent from the filter beds, we have seen a marked decrease in the incidence of the so-called water-borne diseases, viz., typhoid fever, dysentery and cholera. Sand filters that are operating satisfactorily serve to remove the disease-producing bacteria so that the health of the community using the purified water is protected.

We have learned through studies in the laboratory that the purification of water by sand filters is brought about by certain species of bacteria contained in the applied water, which accumulate on the surface of the sand, and it is in this surface layer of slime that the disease-producing bacteria are killed. The removal of the disease-producing bacteria from the applied water is probably caused by several agencies, but becomes possible only when the surface layer covering the sand has become active, so that indirectly, at least, the removal of the disease-producing bacteria from water depends upon the presence and action of the water bacteria.

In the biological methods of sewage purification the function of the bacteria utilized in these processes is primarily the decomposition of the organic matter derived from human waste so as to render it non-putrescible. An effluent from a sewage purification plant which is non-putrescible does not yield food for the ordinary disease-producing bacteria, so that these will die in time from lack of food. The effluent may also be treated with chemicals so as to kill the bacteria quickly. The putrescible nature of sewage makes its purification and disposal a serious problem and our best results are obtained by utilizing the reducing powers of certain bacteria contained in the sewage.

The purification of water by the different biological methods, as filtration, and the sterilization of water and sewage by the use of chemicals, as hypochlorite of lime, hypochlorite of soda and liquid chlorine, have been of immeasurable value in conserving the public health. Each of these preventive measures has been perfected in the laboratory by tests carried out many times in order to study their efficiency.

In baking bread in the household, the dough is leavened with yeast and this practice dates back to very ancient times. The yeast acts upon the sugar and converts it into carbon dioxid and alcohol. It is the carbon dioxid which is generated by the action of the yeast on the sugar that causes the dough to rise and makes the bread light.

Impure yeast, that is, yeast cultures that are contaminated with so-called wild yeasts, or with bacteria, does not yield a good bread. The problem of cultivating the yeast is often a troublesome one for the housewife, since it is practically impossible to exclude the extraneous organisms from the culture medium which is employed. It would be desirable to find a culture medium which would be injurious to the extraneous organisms and not to the baker's yeast; but a satisfactory culture medium of this kind has not been found.

Recently a bacillus has been discovered which can take the place of the yeast in the fermentation of salt-rising bread. This bacillus produces a bread which is acceptable to all who have

used it. Bread fermented in this way has been baked by a large bakery with entire success. To what extent this bread can take the place of the ordinary baker's bread remains to be seen. Whether the new ferment will be more easily handled by the housewife also remains to be determined.

The greatest service of bacteriology to the advancement and well-being of mankind has been in its relation to the causation, diagnosis, treatment and prevention of disease. Practically all the important advances in modern medicine and hygiene have arisen from an understanding of the functions of the disease-producing bacteria.

The service of bacteriology in the study of the cause of disease has been so great as to place medicine on an entirely different basis today from that which it occupied even less than a half a century ago.

As one disease after another was studied by the earlier bacteriologists it was found that bacteria were the causative agents for many of them. A few of the important diseases have resisted up to the present time all our efforts to find the causative agents. When the causative agent of a disease became known it was not long until the natural history of the bacteria causing the disease had been studied and we could avail ourselves of the application of the knowledge gained to aid in diagnosis, prevention and treatment.

When the cause of a disease is known the door is opened to the diagnosis of the disease by finding the causative agent in the excretions or blood and preventive measures may be devised to protect the community against its extension.

The knowledge of the causative agents of disease has led up to the equipment of extensive laboratories by city and state health authorities in which the diagnosis of disease is made by trained technicians without charge. The early and certain diagnosis of disease has had a tremendous influence on the prevalence of the infectious diseases.

Bacteriology in its broadest sense is not limited to the demonstration of the bacteria in the excretions or the blood of the sick

individual in order to make a diagnosis. Delicate blood reactions have been discovered which occur in the serum of the sick individual as the result of the changes produced during the course of the disease, whereby the particular disease can often be detected with great positiveness. The earliest test of this kind to come into general use is the agglutination reaction first suggested by Widal and his associates for the diagnosis of typhoid fever. The agglutination test can also be utilized in the diagnosis of other diseases, notably in paratyphoid fever, in dysentery and in Malta fever.

The so-called tuberculin tests which are employed to determine whether a person has tubercular infection are valuable diagnostic aids. With the aid of these tests we are able to separate those having the disease from healthy persons, and this is advisable in institutions where large numbers of children are being housed, so as to avoid the dissemination of the disease and to place those having the disease under appropriate treatment.

Our knowledge of bacteriology has been especially helpful in the prevention of disease. The dissemination of many of the specific transmissible diseases may be largely controlled by measures directed toward the localization of the infection through isolation and quarantine and by the destruction of the disease-producing agents as they leave the body of the infected individual.

The disease-producing bacteria have, as is the case with all living things, a primary function of preserving the species. Although they produce their harmful effects when within the human or animal body, they defeat their primary function when the infected individual dies and in consequence they perish with it. In order to preserve the species it is necessary for the bacteria to leave the body of the infected individual and gain access to the body of a healthy individual, as few species of disease-producing bacteria can exist for a great length of time outside the body of their particular host.

In the prevention of the dissemination of the disease-produc-

ing bacteria from the infected individual to healthy individuals we apply our knowledge of the relation of the bacteria to humanity in a most useful way. Through these endeavors much suffering and expense are avoided every day.

Efforts to kill the infectious bacteria through the use of various disinfectants may be classed amongst the preventive measures against disease. The disinfection of infected rooms, clothing and utensils is one of the safeguards against the dissemination of the disease-producing agents. The disinfection of the infectious excretions of the sick person is a measure of even greater value because the destructive action of the disinfectant can be brought to bear upon much greater numbers of the disease-producing bacteria.

We are beginning to rely on bedside disinfection in preference to room disinfection, as formerly practiced. If the nurse can promptly disinfect all the infectious materials coming from a sick person it is evident that room disinfection will not be required. Since we are rarely able to be certain that all the disease-producing bacteria are killed in our efforts to disinfect the excreta we still regard room disinfection as essential.

The control of disease is dependent upon its early recognition, because the sooner disease is recognized the sooner may curative and preventive measures be applied. Many diseases pursue a mild course and frequently go unrecognized and in this particular the science of bacteriology has given valuable service. Disease may be recognized not only through the finding of the causative agents in the blood or excretions of the sick individual, but also in the detection of very delicate reactions in the blood of the individual which are absent from the blood of normal persons. The diseases in which these delicate reactions occur are especially tuberculosis, cholera, dysentery, typhoid fever, Malta fever, diphtheria and syphilis.

The diagnosis of disease by the recovery of the causative organism from the blood or excretions of the sick has become an important part of the work of state and city boards of health. The diseases which are most commonly diagnosed in this way

are the various suppurations, pneumonia, diphtheria, typhoid fever, dysentery, cholera, tuberculosis and numerous other less common diseases. In many of these diseases specialized culture media have been devised to accomplish the recovery of the infective organisms and a corps of specially trained technicians is employed in the laboratories to do this work.

Thirty or forty years ago very little was known of the etiology of the transmissible diseases. In those days the student of medicine spent a great deal of time in the study of the pathology of disease. The greatest interest was taken in the study of the effects produced by the disease processes by making observations post mortem. A great change has come over the attitude of the minds of medical men through our knowledge of the action of bacteria in the causation of disease and in the production of pathological changes in the body during the course of the disease.

Today a great deal of attention is given to the study of the mechanism of disease production in order to elucidate the reasons why certain pathological changes are produced by the bacteria and how those effects may be prevented or overcome.

We have learned that disease is a bio-chemic process induced through the interaction of the bacteria and the tissues of the invaded part. Disease is essentially an intoxication brought about by poisons produced by or contained in the bacteria and which on liberation induce the symptoms and changes which characterize the disease. In other diseases poisons are generated in the diseased tissues which in turn react upon the body.

The discovery that disease in many instances is essentially an intoxication and that the body overcomes the intoxication through the elaboration of specific antidotes opened the way for Behring and his associates to develop an antitoxic state in animals treated with diphtheria toxin. These and other studies have led to the perfection of the diphtheria and tetanus antitoxins which are today amongst the foremost therapeutic and preventive agents employed in medicine.

If an animal, as the horse, sheep or rabbit, is treated by hypodermic injection of gradually increasing doses of the toxin produced by the diphtheria or the tetanus bacillus, there are formed in the blood of the animal antidotal substances which will neutralize the action of the toxin. The animal can be brought to a high state of resistance if the injections are made in proper graduations and are continued for some months.

When such an animal is then bled, its blood serum contains the antidotal substance in large quantities and the serum has distinct protective and curative properties.

If antitoxin is administered before infection takes place, absolute protection can be afforded against the invasion of the body by the particular bacteria. If the disease has already started, recovery is practically certain if the antitoxin is administered early and in sufficient quantity.

While the application of the antitoxic principle is limited to diphtheria and tetanus, we have in vaccine therapy, that is, in the injection of the dead bacteria into the infected individual, means of curing the infection if it is prevailing in a chronic or subacute form.

The bacterial vaccines have, however, found their most important triumph in the prevention of disease. The greatest benefit in the application of bacterial vaccines to this purpose is seen in the prevention of typhoid fever through the immunization of healthy individuals by injections of typhoid vaccine. Since the introduction of typhoid vaccine as a preventive of typhoid fever in the soldiers and marines of the United States Army and Navy, typhoid fever has practically disappeared from these two arms of the government service. This is one of the great triumphs of modern science, because we are able to relieve humanity of untold suffering and expense through this means.

In the treatment of the transmissible diseases bacteriology has been of great assistance to medicine and has made it possible to heal many diseases which would otherwise prove fatal. The assistance of bacteriology in the treatment of disease has taken

three distinct routes to solve the problem. The signal aid of bacteriology in the treatment of disease has been in the perfection of the curative serums derived from animals that have been rendered immune to the disease-producing bacteria themselves or the poisons which they produce. The best-known serums in use today are the diphtheria and the tetanus antitoxins—the anti-pneumococcus, anti-streptococcus and the anti-meningitis serums. These different serums have been the means of saving hundreds of thousands of lives each year since their use has become general.

A second method by which bacteriology has been of service in the treatment of disease is in the use of dead bacteria administered hypodermically. This method consists in attempting to build up in the body of the sick individual an active resistive state. Although the individual is already suffering from disease, we are able to induce the tissues to form antidotal substances when dead bacteria are injected into healthy tissues in some part of the body not affected by the disease process. The most important disease which is being treated by the hypodermic injections of dead bacteria is tuberculosis. Aside from the use of several forms of tuberculin—that is, the poisons of the tubercle bacillus—we also employ the dead tubercle bacilli as therapeutic agents. Some of the chronic types of infection by the pus-producing bacteria—that is, the staphylococci and the streptococci—are greatly benefited by periodic injections of killed cultures of the particular type of bacteria causing the disturbance. In these latter infections it has been found that the bacteria derived from the sick individual himself are of greater benefit than those of the same species obtained from another patient suffering from a similar affection.

In determining the effect of vaccine treatment of different diseases several delicate blood reactions are now employed which enable us to ascertain the response of the system to the treatment employed and indicate the time and dosage of the next treatment. These methods permit the physician to gauge the degree to which the patient is producing and storing up in

his system those antidotal substances which aid him in regaining his health.

Along this line of endeavor is the method of determining whether a child has a natural resistance against diphtheria or not. Instead of administering antitoxin to all the children exposed to infection, by the use of a simple test, intradermic injection of diphtheria toxin, we are able to ascertain whether they are susceptible or not, and then immunize those that show susceptibility.

A third method in which the treatment of bacterial diseases is now conducted is in the hypodermic use of several new chemical compounds. The chemical compounds which have been found most useful in this respect are neosalvarsan and atoxyl, organic compounds of arsenic, the former in the treatment of anthrax infection and the latter in the treatment of infections by the bacteria of suppuration.

Bacteriology has also benefited humanity in the aid it has given to surgery. Before the time of the development of bacteriology it was a common thing to see such diseases as hospital gangrene and erysipelas carry off large numbers of patients in hospitals. Sepsis was also the cause of high mortality in the treatment of surgical diseases. Since the discovery of the relation of bacteria to sepsis and the application of antiseptic and aseptic methods, hospital gangrene and erysipelas have practically disappeared and fatalities from septic infections have become comparatively rare.

While formerly it meant almost certain death to the patient for the surgeon to open any of the great body cavities or the larger joints, these regions are being explored every day under aseptic precautions without fear of septic infection. These advancements in surgical practice have been largely worked out by the surgeons, but all these advancements became available only through the application of bacteriological knowledge.

Brain, lung and heart surgery are undertaken today without danger to the patient, though these are regions of the body where the surgeon of twenty-five years ago would not have dared to enter.

STUDENT LIFE AT THE CLOSE OF THE MIDDLE AGES

By Daniel B. Shumway

Professor of German Philology, University of Pennsylvania

To us in this age of universal education and compulsory schooling, when it is a rare thing to find an illiterate person, it seems hard to realize that there was a time in the history of man, and that not much more than a millennium ago, when children did not have to go to school, when they did not have to spend several hours every day in poring over their books, but were free to roam in the open air through the fields and forests; but such was the case. Before the advent of Christianity in Northern Europe, schools, in the strict sense of the word, were unknown. Children were, of course, taught how to use weapons, to hunt, to till the soil or instructed in some useful occupation or means of earning a livelihood, but education, in the way we use it today, did not exist.

As Christianity spread, however, the question arose of how to train native priests and monks. Schools were, therefore, early established for this purpose at the various monasteries. At first these were intended only for the clergy and the instruction offered was mainly of a religious nature. The principal stress was laid on Latin, which, as the official language of the church, all priests were required to know. The course in these schools extended often eight or ten years, as no one could become a monk before eighteen and boys were often admitted at ten years of age. Later, those were received who did not expect to become members of the order and by the ninth century nearly all monasteries had schools for the sons of the neighboring gentry.

The course consisted of the so-called Seven Liberal Arts, divided into two groups. The first group, comprising gram-

mar, rhetoric and dialectics, was called the "Trivium," because of the three studies it contained. From this word we get our adjective "trivial," which in Shakespeare's time still had its original significance. The second group, comprising arithmetic, geometry, music and astronomy, was known as the "Quadrivium," because of its fourfold nature. Grammar included the study of literature, *i. e.*, Latin literature and the church fathers. Rhetoric included some knowledge of history and law. Dialectics, or the science of argument, comprised what is known today as formal logic, according to the syllogisms of which the students were supposed to argue. Geometry embraced, in addition to the theorems of Euclid, also geography and surveying. Astronomy included astrology and what little physics there was. Music embraced the singing of church hymns and a knowledge of the history and theory of music. One sees that the education thus provided was for its time broad and extensive and that the term liberal arts was no misnomer.

This education, as we have seen, was confined to embryo priests and the sons of nobles. With the accession of Charlemagne to the throne, however, a systematic attempt was made to extend it to the masses. Broad-minded, far-seeing and imbued with an eager desire for knowledge, Charlemagne was quick to perceive the advantage which would accrue to his people from a greater extension of education and to his kingdom from the greater unity which a common language and common ideas would produce. He, therefore, endeavored as far as possible to found new schools and to promote educational facilities.

Naturally, the results accomplished fell far short of his ideals, as the great mass of the people were still too rude and barbarous and the means at his disposal for founding and maintaining schools very limited. He succeeded, however, in establishing an excellent school at his court, the so-called Palace School, at which the sons of his courtiers were educated. He sent for the learned Anglo-Saxon Alcuin to be the head

of the school and to act as his adviser in educational matters. On Alcuin's advice he decreed that schools should be opened at every monastery and cathedral. Most of these did not survive long after Charlemagne's death, but still quite a number existed throughout the Middle Ages. For example, famous schools were located at Fulda, Mainz, Trier and Hildesheim in Germany; at Reichenau and St. Gall in Switzerland; at Tours, Paris, Rheims and Rouen in France, and at London.

Such was the status of the schools down to the crusades, when the contact of the Europeans with the civilization of the East disclosed to them the treasures of learning of the ancient Greeks, which, to a large extent, had passed into the hands of the Arabians. Through them the scholars of Europe became acquainted with the writings of Aristotle, Galenus and various Neoplatonists on philosophy, medicine and natural science. The result of the inspiration received from these sources was the erection of special or technical schools in these subjects. Thus were established the famous schools at Paris and Montpellier for theology and philosophy, at Bologna for law and at Salerno and Montpellier for medicine. These schools formed the nucleus from which in each case the universities were later developed by combining all the various faculties or special schools under one corporation.

Thus the University of Bologna was chartered in 1158 by Frederick Barbarossa and by 1200 had over five thousand students enrolled. The University of Paris, the most famous of all the medical universities, received its charter in 1180. It developed out of the cathedral school of Notre Dame and rapidly grew into fame through the brilliancy of Abelard, whose lectures on dialectics attracted thousands of students. In England, Oxford is supposed to have been founded in the second half of the twelfth century; Cambridge, in the beginning of the thirteenth. In Germany, the oldest university, Prague, was instituted in 1348, Vienna, Erfurt, Heidelberg and Cologne soon following, so that by the Renaissance almost eighty universities existed in the various countries of Europe.

As the towns grew in importance and influence and the citizen class became richer and more influential, there was felt the need of city schools for the education of the children of the well-to-do citizens. These schools were organized first in connection with the universities, as at Cambridge, and then in all large towns. The older ecclesiastical schools, connected with cathedrals and monasteries, continued to exist and were attended by ever-increasing numbers. Schools were also instituted in connection with ordinary parish churches where no cathedral existed. Education, *i. e.*, the ability to read and write and the elements of Latin, was therefore far more general during the Middle Ages than was formerly believed. Nor was this knowledge confined entirely to the clergy. The bailiffs of all large manors kept their accounts in Latin and each great noble employed a grammar master to teach his children and the children of his neighbors of gentle birth. In other cases, the parish priest or clerk was required by law to teach the boys to read as well as to sing their Psalter. In fact, Rashdall, the author of a most valuable work upon universities in the Middle Ages, is not far from right in stating that in the later Middle Ages all of the smaller towns and even many of the larger villages possessed schools where a boy might learn to read and acquire the first elements of Latin.

These were called grammar schools, for Latin grammar was the principal study, and this was carried on for years to the practical exclusion of everything else. The name grammar school has been retained in its original significance in the so-called grammar schools of England, such as Eton and Harrow, but in this country the name has been applied, to the second stage of elementary education without any reference to the study of Latin.

As these schools prepared the pupils for the universities and for the theological schools, in both of which all the lectures were delivered in Latin, the students being supposed to talk only this language, it was necessary to spend years in learning the grammar thoroughly and in acquiring fluency in express-

ing oneself in Latin. The grammars of Donatus, of Priscian and of Alexander de Ville Dei, which were the ones mainly used, were written in Latin and the rules of grammar largely given in the form of Latin hexameters. These rules were often committed by the scholars in parrot fashion, without their really understanding the words. Books were very scarce and costly before the invention of printing in the fifteenth century, and as frequently only the teacher possessed a copy of the text to be studied, a great deal of time was wasted in copying the book from dictation before the interpretation of the text could begin. Manuscript is very bulky, as everyone knows, and the scholars were often loaded down by the weight of their copybooks, in which they had written down the various texts used.

After the Psalms had been learned, and these were taught in the elementary schools, the pupils began to read Cato, a didactic treatise of the fourth century containing rules of etiquette, and then passed on to Ovid and Virgil and finally to the dramatists Terence and Plautus. Greek was almost unknown, except in translation, until the Renaissance, towards the close of the fifteenth century, when it was gradually introduced as a study in the universities. The authors that were read were used mainly for the purpose of inculcating the rules of grammar, little or no attention being paid to the subject matter or to the niceties of style and diction. Thomas Platter, a writer of the sixteenth century, who has left us an autobiography recounting his experiences as a schoolboy, relates that they were obliged to parse, decline or conjugate every word of a comedy of Terence, which they read. How little of the real humor of the piece probably survived this dissecting process may easily be imagined.

As to the time spent in learning the grammar, we have interesting testimony from the famous humanist, Jacob Wimpheling, who was very active in school reforms at the beginning of the sixteenth century. He mentions, as an especial merit of his method, that the scholars no longer needed to spend ten years learning the declensions.

The well-known reformer, Martin Luther, was as interested in school reform as in church reform and in a letter addressed to the mayors and councilmen of all German cities, he scourges in no sparing terms the abuses of the old system. "What have people learned hitherto in the high schools and cloister schools," he asks, "except to become donkeys and blockheads? Twenty and even forty years people have spent in studying and at the end have known neither Latin nor German. Is it not an outrage that a boy hitherto was obliged to study twenty years or longer merely to learn a little wretched Latin sufficient to enable him to become a priest and read mass? The teachers we had were bad, were themselves ignorant and unable to teach anything worth knowing. The whole fault," he continues, "lies with the clerical and sophistical books, which have been in use till now." This is certainly a vigorous denunciation of the system and its results; but if Luther occasionally exaggerates in his zeal, one can rely on the picture being true as to the main facts.

Corporal punishment was also carried to excess in the schools of the time. The teachers made up for what they lacked in knowledge by unnecessary cruelty towards the scholars, who were often kept in a state of terror. Upon this point Johannes Butzbach, another scholar of the sixteenth century, who also wrote the account of his experiences as a boy, gives us interesting information. He relates that for having repeatedly played truant from school, the teacher seized him, stripped him of his clothes, bound him to a post and belabored him so savagely with birch twigs that his whole back and shoulders were covered with blood. During this procedure the other scholars had to sing a song, probably for the purpose of drowning the cries of the unfortunate victim.

Luther also describes in terse, vigorous language the tortures which the school boys in his youth had to undergo. The teachers of that day, he tells us, were tyrants and torturers, the schools were dungeons and places of torment and in spite of all the beating, trembling, fear, terror and misery, the

scholars learned nothing. One morning he himself was beaten fifteen times for not being able to recite something which he had not been taught.

The well-known humanist, Erasmus, relates that the students in Paris were whipped till the blood came, and not only young boys, but also grown persons, had to undergo corporal punishment for trivial offenses. Agricola, another famous humanist, relates that still in 1519 scholars of twenty-four years of age were beaten by the teachers with rods. If, however, the latter went too far in their cruelty and injustice the scholars often revolted and the matter ended at times in a riot accompanied by bloodshed. Let us hope that conditions were not everywhere as dark as those just painted. The beating of adults must have been, on the whole, of rare occurrence, as punishment of this kind ceased when the student entered the universities.

By the close of the fifteenth century the revival of learning had aroused such an interest in the humanities that the number of those desirous of obtaining a higher education swelled to large proportions. The schools were not able to accommodate all applicants and many popular schools were so overcrowded that efficient teaching was well nigh impossible. We are told that in the St. Elizabeth School of Breslau nine teachers taught in one room. The humanist, Sapidus, had at one time 900 scholars under him and in Deventer no less than 2,200 sat under the instruction of Alexander Hegius. In many cases the scholars were obliged to travel long distances to find a school which could accommodate them. Butzbach, *e. g.*, relates that he traveled all the way from Nuremberg to Bohemia before he found a school which would receive him.

As an example of how eager some of the students were to make the best possible use of their time, it is told of Alexander Hegius that as a student he devised the following ingenious plan to keep himself awake at night while studying. He held in his hand a lighted end of a candle, so that whenever he

dozed off he would be awakened by the pain caused when the candle burned down to his hand.

At first, as we have seen, only the sons of nobles or of wealthy citizens received the benefits of an education, but as the desire for learning became more and more widespread, increasing numbers of children of poor parents who could not afford to support them while at school, ventured forth from home to obtain the coveted learning as best they could in various ways, but mostly by singing and begging. This practice became almost universal among poor students and no disgrace attached to anyone who strove to obtain food and sustenance in this way. Luther, *e. g.*, was one of those who had to earn their living by going from door to door singing and begging for food. He tells us that he and his comrades went around singing at Christmas in Eisenach and the surrounding villages, very much after the fashion of the English "waits."

In many large cities especial provision was made for the support of such poor scholars. Through the liberality of well-to-do citizens especial houses were built for their accommodation. Thus the St. Elizabeth School in Breslau owned a large building containing one hundred rooms or "cells" as they were called, where the older scholars lived. The younger ones, however, were often forced to sleep on the floor of the schoolroom. This they exchanged in summer for the churchyard, where they slept on straw which they had gathered from the streets, it being the custom to have it strewn fresh every Sunday before the houses of the rich citizens. There were also many endowed schools, where the scholars lived together and received instruction free. In Breslau alone there were eight public schools of this character.

As may well be imagined, the sanitary arrangements and general cleanliness of such buildings left much to be desired. The plague of the poor in earlier times was vermin. Platter tells us that in the school infirmary, where the sick scholars received good care and attention, the beds were so full of

vermin that he preferred to sleep on the floor in front of the hearth.

As a rule, no provision was made for feeding the scholars in these schools and the poorer ones were forced, as already mentioned, to forage for themselves. This they found an easy task to do, especially in the large commercial towns. The merchants who had acquired wealth gladly gave to the support of deserving scholars. We must remember that a good education which seems such a matter of course to us today, was very rare in the fifteenth century, and everybody was intensely interested in the new learning which had come in the wake of the Renaissance and which for the first time was placed within the reach of everybody. The citizens saw in these struggling scholars the intellectual leaders of the next generation and gladly aided them in every way. The number of those who were dependent upon public charity was in many places very large. Platter relates, *e. g.*, that at the time he studied in Breslau there were several thousand such scholars in the city.

In most large towns these scholars were divided off into separate associations, to each of which a special part of the city was assigned for the purpose of begging and singing for alms. Any trespassing on the part of a scholar of one association upon the territory of another was followed by summary punishment, if the offender was caught. And as the association generally took the part of one of its members, it often gave rise to a battle royal between the different organizations. Every poor scholar was forced to join an organization in order that his begging should not be in any way to the detriment of his fellow pupils.

The scholars were obliged to be regular in attendance upon the recitations and if one persisted in absenting himself the whole school, with the schoolmaster at the head, marched to his house and dragged him by force to school. Platter tells of a regular bombardment in Nuremberg between the truants and the school, in which the former, safely ensconced on the

roof of a building, threw down such a shower of stones upon the heads of the scholars, who had come to fetch them to school, that the latter were compelled to beat a retreat. Such a breach of the peace was not permitted to pass unpunished, however, and the triumph of the truants was short-lived. The very next day they were summarily ejected from the city by the town council.

As a rule, the majority of the scholars were industrious and orderly. Many, however, became enamored of the free, careless life of the student and were in no hurry to exchange it for any serious occupation by completing their studies. Influenced also by the roving life of the mendicant friars there thus grew up a large class of wandering or vagrant scholars who passed the winter in some large town, but in summer traveled around the country from one school to another, or what was more likely, carefully avoided the towns where schools existed. They obtained their living by fair means or foul, stealing and pilfering everything they could lay their hands on; the terror of all the simple-minded country folk, whom they found an easy prey and whom they cheated and robbed in various ways.

They frequently organized themselves into guilds, known either as "Goliardi," from the French "gaillard" (gay), or as "Vagantes," from the Latin "vagari" (wander). They led a Bohemian sort of a life, drinking and singing rollicking Latin songs, some of which have persisted till today. In Germany these wandering scholars were divided into two classes, according to age and degree of knowledge. The older ones, who had already attended school for some time, were called "Bacchanten," a term undoubtedly derived from the present participle "bacchans, bacchantis" of the Latin verb "bacchari" signifying originally "to celebrate the feast of Bacchus," then generalized to mean "to roam around wildly" and "to drink immoderately." The younger scholars, who were often little boys of the tender age of ten or eleven, and who were entrusted to the care of the older scholars by their anxious parents, were

called "Schützen," a word which literally means archer or marksman. This name has survived very curiously in modern German in the term applied to children learning their A. B. C.'s, who are called "A. B. C. Schützen."

The life of these younger scholars was at best anything but pleasant, as they were treated as slaves by the "Bacchanten." They were compelled to perform every service, no matter how irksome or revolting, which their masters required of them. The fagging system of some of the older English schools, so graphically described in "Tom Brown at Rugby," is in all probability a survival of this ancient custom. If the "Bacchanten" were kind-hearted and industrious, the life of the little "Schützen" was endurable, but too often the older scholars were rough, boorish fellows, little better than vagabonds and desirous only of leading the free, careless life of the tramp. They wandered from country to country, from Italy to Bohemia, from Holland to Hungary, through the length and breadth of Europe, often without attending a single school. The little "Schützen" were forced to provide food for their masters in these trips by begging or by making raids on the poultry yards of the farmhouses. Not infrequently they were compelled to sit by and play the unenviable rôle of spectators while their masters gorged themselves with the choicest portions, thankful indeed if they received anything at all of the ill-gotten booty.

The tales of the severity and cruelty with which the little fellows were treated by the "Bacchanten" are well-nigh incredible. We are fortunate enough to possess accounts of the experiences and sufferings of two little "Schützen" in the autobiographies of Thomas Platter and Johannes Butzbach, already mentioned. Both were the children of poor parents and both had the misfortune to fall into the hands of specimens of the worst type of "Bacchanten." It will be interesting, I think, to stop a few minutes to obtain an idea of the vagrant life and hardships of these little scholars with the aid of these autobiographies.

Thomas Platter was bound out by his parents when but seven years of age, and after three years of hardship in the services of a farmer, and later of a priest, he was entrusted to the care of a large scholar, a cousin of his. Only ten years old and holding tight in his tiny fist a gold guilder, the only thing which his parents had been able to give him, little Thomas set out with his cousin in the fond belief that all his troubles were over. He soon discovered, however, that they were only just beginning. His cousin took possession of his one treasure, the gold guilder, and informed him with many threats that he was expected to provide food for them both by begging. This he found at first no difficult task, for the people, amused by the quaintness of his Swiss dialect and touched by his youth, gave him freely whenever he asked. His cousin was soon joined by four other "Bacchanten," accompanied by two little "Schützen" and thus, to the number of eight, they started off on the long journey to Saxony. Unaccustomed to walking long distances and being the youngest of the party, Thomas found it hard to keep up with the rest. But whenever he lagged behind his cousin tingled his bare legs with a switch which he had cut for the purpose.

The experiences of Johannes Butzbach were even worse than those of Platter. Until his cousin had obtained the consent of the parents, he played the hypocrite, pretending to be very good and proper; but no sooner had they left the village behind them than he showed his true character and began to swear at and to scold his young charge until the latter trembled with fright. After a walk of ten miles they reached a little town by the name of Külsheim, where they proposed spending the night. Here they put up at an inn, where the cousin ordered a fine supper for himself and some friends who had joined them. No attention was paid to footsore, tired, little Thomas, who had flung himself exhausted on the floor behind the stove. Though suffering from hunger, for in the excitement of leaving home he had eaten very little in the morning, he did not dare to take a seat at the table uninvited. He

closed his eyes and feigned sleep, although the pangs of hunger prevented him from thus forgetting his sufferings. To crown his misery he saw through half-closed eyes that his cousin paid for the meal with the money he had received for Johannes from the latter's parents. The Bacchant considered the little fellow his property and made no nice distinctions between mine and thine.

If the region through which they were passing was thinly populated, they found it difficult to obtain anything to eat, sometimes having only raw onions. In one case, as Platter relates, they subsisted for several days on roasted acorns, crab apples and pears. They generally slept under the open sky and frequently had dogs set upon them by the irate peasants whose property they stole. On reaching Breslau, however, they found food in such abundance that they all made themselves seriously ill from over-eating.

No matter how hungry the little Schützen were, they dared not touch any of the food they had begged until the Bacchanten had satisfied their hunger. In many cases the latter allowed the food to spoil rather than give it to their young charges. Platter relates that his cousin often had so much bread on hand that it became mouldy, and that he then cut off the mouldy part and forced the little fellow to make his meal on that or go hungry. If the Bacchanten suspected the Schützen of having eaten any of the food before returning to camp, they had a very effective means of ascertaining the truth. They forced the Schützen to take a mouthful of water and then spit it out into a dish of water. If the water showed any treacherous signs of fat or grease, condign punishment was visited upon the head of the unfortunate boy. In one case, Platter relates, they threw him on the bed, placed a pillow over his face to stifle his screams, and beat him until they were forced to stop from sheer exhaustion.

Even in the large towns, when food was plenty, the Schützen fared but little better. If the Bacchant had been relieved of want by the liberality of some rich family and no longer needed

the services of his charge, he usually turned him over to some other less-fortunate Bacchant, for whom he was forced to beg and steal as before. Butzbach relates very graphically what happened to him when he refused to enter the service of another Bacchant. "The Bacchant seized me," he said, "as I was returning from school, dragged me, with the help of his companions, to his room, stripped off my clothes and beat me with rods over my whole body and left me bound over night, naked as I was, upon the bed in the icy-cold room. In the morning he returned and asked me if I was now willing to do as he wished. Half dead from cold and hunger I answered 'Yes,' and he handed me over with curses to the other Bacchant and went home." Again Butzbach escaped and took refuge in the house of a rich merchant. The Bacchant, however, soon discovered his hiding place and, accompanied by a large number of his comrades, marched to the house and demanded his surrender. As they stormed up the stairs they were met at the top by the head of the house, who, slashing right and left with his sword, soon put the students to flight. Butzbach was, however, still in a sorry predicament, since he did not dare to venture forth from the house either to go to school or to do errands, as the Bacchanten had threatened to tear him to pieces if they caught him. To escape their wrath he was forced to flee secretly from the town.

One would imagine that after such experiences Butzbach would have had but little desire to continue his studies; but no adversity of fortune was able to break his spirit or lessen his eagerness for an education, and though many years passed before he made his way home and again found an opportunity of continuing his studies (having been captured by a count and carried off to Bohemia), he made up for lost time when the opportunity did finally present itself. While studying he supported himself by working as a tailor, a trade he had learned on his wanderings, and the little Schütz and tailor's apprentice finally became a respected clergyman, a great scholar and a famous author.

As a result of the many years spent in roaming around, the scholars often grew up into large, strong fellows without having really learned anything. Platter relates, *e. g.*, that when he finally found an opportunity to attend a good school he was eighteen years old and had not learned even the rudiments of Latin. Sitting in the schoolroom among all the little children of the lowest class, he resembled, he tells us, a hen surrounded by her chickens. Such, however, was his zeal that he learned his Latin grammar by heart, although he did not understand a word of it and could not have declined a word of the first declension if his life had depended upon it.

Butzbach was likewise seventeen years old before he again attended school in Deventer, and was forced to begin with the little children in the seventh class. He applied himself, however, with such good effect that after two years he was admitted to the third class.

Many poor scholars, however, were not as fortunate as Butzbach and Platter in finally obtaining the coveted education. They failed to reach the goal of their ambition and died miserably unknown and unmourned, without leaving behind any account of their sufferings and privations. But their lives give eloquent testimony to the desire for education which animated so many in the transition period from the Middle Ages to modern times. It was such scholars as Butzbach and Platter who helped to dissipate the mists of ignorance which had hung so long as a pall over the world and who placed themselves at the side of the great reformers and won with them the glorious victory over bigotry and superstition, and paved the way for an era of enlightenment and greater intellectual development. We talk a great deal about the good old times, but when we lay aside the rose-colored glasses through which we are accustomed to regard the past, we are startled at the grim picture which it presents. But there is one thing for which we can envy the people of those times, and that is for their enthusiasm which enabled them to live or to die if necessary in the effort to attain their aims.

Let us now follow the scholar from the lower school to the university. Here the Bacchant who had for years bullied his young charges was in turn taken in hand and put through a sort of initiation, which resembled somewhat the initiations in the various college fraternities of today. The name given to the new student at the university was "beanus," probably a Latinization of the French expression "bec jaune," yellow bill, used to indicate the callowness of the student, just as the Germans today still use the word "Grünschnabel," or green bill, for one who is especially green. Our word freshman corresponds, therefore, very well to the "beanus" of the Middle Ages.

In Germany the initiation or hazing of the new student assumed a stereotype form. He was considered a wild animal who had to be tamed and whose horns must be cut off, as we know from a little Latin treatise of the fifteenth century which gives a detailed account of the procedure. At first the practice was frowned upon by the university authorities, but it gradually received official sanction until at last it became, as it were, a regular part of the matriculation ceremonies.

The victim was dressed up to resemble a wild animal by means of a cap adorned with horns and long ears. The other students now enter and pretend to smell a frightful stench, which they soon discover proceeds from the newcomer, whom they take to be a wild boar. After a good deal of chaff upon the wild glare of his eyes, the fierce aspect of his tusks, etc., they proceed to remove those features which cause him to appear like an animal. The face of the victim is first smeared with soap, the tusks are sawed off and the long ears, hair and nails clipped. The ceremony is closed by shriving the victim, who is first made to confess to all sorts of crimes, after which he receives absolution and proceeds to the matriculation proper. This ceremony lasted through the sixteenth and into the seventeenth century, when it was supplanted by the so-called practice of penalism, which strongly resembled in its essential features the fagging system of English schools, but was more severe in its brutality.

In France the ceremony was somewhat different, the new student being looked upon not as a wild animal, but as a criminal who had to be first tried, then purged of his sins. From the institutes of the University of Avignon we learn that the freshmen had to serve the seniors at table, were not allowed to stand between them and the fire, were not permitted to sit at the first table nor to address each other as "domine"—*i. e.*, sir. Whenever the "beanus" transgressed these rules his punishment consisted of a prescribed number of blows with a wooden paddle. During the purgation at the University of Aix, the "beanus" received three blows with a frying pan or a book from each one present. From a chance allusion we learn that it was the custom at the Sorbonne in Paris to wash the freshmen on Innocents' Day. Previous to the ceremony of washing they had to ride upon donkeys in a procession through the streets of the city.

The university students of that day had not the freedom which they now enjoy. They were, as a rule, somewhat younger than is now the case, the average age of a freshman being from thirteen to sixteen, and they were treated as schoolboys who must be looked after. In fact, the medieval university resembled a big boarding school. The teachers and students, especially of the course in arts, lived together in the university buildings. Each university had several colleges to which the students belonged, just as in England today. When the number of students was too great to be accommodated in the university buildings, the different teachers or masters were allowed to keep boarding houses for the students. As all the living expenses were paid from a common purse—in Latin, "bursa"—the students were called "bursæ." This word has survived in the German word "Bursch," meaning a fellow or lad, and in the English "bursar" or "purser," really the keeper of the purse.

At many universities the students were compelled to return to their lodgings when the curfew was rung at 8 or 9 P. M. The whole daily life of the student body was regulated down to the minutest details. There were but two meals a day, the "pran-

dium" or breakfast at 10 and the "cœna" or dinner at 5. Young boys, or those who were weakly, might have in addition an early breakfast, but as a rule it was dispensed with. The period from 6 to 10 in the morning was devoted to study and lectures. After the "prandium" a short period or recreation was allowed and the lectures began again at 12 or 1 o'clock and continued till 5.

As to dress, no official costume was as a rule prescribed, but as the greater part of the students were studying for the ministry, clerical garb was mostly used. In Italy the students wore a long black robe called the "cappa." In Paris all students were required to wear the tonsure and the clerical attire. We find the statutes continually forbidding the wearing of worldly apparel such as trunk-hose, puffed or slashed sleeves, pointed shoes or boots of colored leather. By the fifteenth and sixteenth century, however, most of the students attired themselves according to the prevailing fashion in brave attire. In some cases, however, the cut and color of the clothes were prescribed. Thus at the College of Navarre they were black, at Queen's College, Oxford, blood-red.

Those who had taken a degree generally wore a distinctive dress somewhat like the academic costume in use today. At first the garb was severely plain and black in color, but in the thirteenth century quite gorgeous colors were introduced. At Paris the rectors wore violet or purple, the masters scarlet with tippets and hoods of fur. Bachelors wore hoods of lambs' wool or rabbit fur. Silk hoods came in toward the end of the fourteenth century for use in summer. The large hood which today serves only the purpose of ornament was formerly much smaller and used as a protection against wind and weather. The "biretta," a square cap still worn by Lutheran ministers in Germany, provided with a tuft instead of the modern tassel, completed the costume, but was worn exclusively by masters and doctors.

As to language, it was expected of all students that they should use only Latin in their daily intercourse; but as the

students, if left to themselves, would naturally have relapsed into their native tongue, spies were employed to see that the rule was strictly followed. These spies were called "lupi"—*i. e.*, wolves—in the students' jargon, and the statutes of many universities provided for their appointment and maintenance. This was especially the case in Germany. As to England, we have no direct evidence from an early period, but they were probably in use there too, for they are referred to in the seventeenth century in the statutes of Harrow School.

One feature of medieval student life which strikes us as very strange in these days of college athletics and sports of all kinds is not only the total absence of any provision for the amusement of the students, but also the fact that the university authorities discouraged and often prohibited amusements of nearly every kind. This finds its explanation in part in the clerical character of the majority of the students and the continual struggle on the part of the authorities to prevent them from becoming too worldly and secularized. The amusements of the knightly classes, which consisted mainly of jousts and tournaments of hawking and the chase, were of course considered too worldly and too expensive for students. We hear some mention of ball being played and music, especially the lute, was greatly cultivated. Luther, *e. g.*, was a very clever performer on this instrument. That the lute was very popular is shown by the many poems praising it for its gentle qualities, which, just the reverse of the fiery and martial trumpet, exerted a soothing influence upon the mind.

The idea that the body needed exercise of some kind does not seem to have occurred to the authorities of that day. The statutes of the College of Narbonne, *e. g.*, forbid the playing with ball and bat as an "insolent" game. The College of Tours forbids the introduction of tennis as being an indecent game which would cause a scandal, but it did permit the use of a soft ball in the college court. Chess, also, which even its most ardent devotee would hardly consider an hilarious sport, is

frequently forbidden, perhaps because it was so popular in knightly circles.

Dancing was a favorite pastime of all classes in the Middle Ages, and was generally of a rather rollicking and violent nature. It was usually indulged in in the open air, under the spreading branches of a linden or oak tree, or in the fields. Goethe has given us a capital picture of such a dance in the Easter scene in Faust, where Faust and Wagner came to a village in the course of their walk and find the villagers dancing on the green. Chaucer, too, in his Canterbury Tales (3329), speaks of a scholar who dances after the fashion of the "scole of Oxenford tho."

That the university students took a lively interest in this form of amusement is evident from the many prohibitions against it in the university statutes. In order to protect the sculpture in the chapel, one of the English universities was forced to forbid dancing or jumping in the chapel or adjoining hall. The same college prohibits wrestling, chorus singing, dancing, leaping, shouting, pouring forth of water and beer, and all tumultuous games in the common hall as likely to disturb those in the rooms below.

As there was practically no legitimate form of amusement, the idle students were forced to roam the streets, playing practical jokes on the passersby or gambling and carousing at the taverns and indulging in street brawls. The University of Leipsic issued in 1495 a proclamation forbidding the destruction of trees and crops in the surrounding country, the throwing of water from windows upon passersby, the wandering around at night and beating the watch, the wearing of disguises or masks and all noisy shouting and singing and interfering with the hangman in the discharge of his duty.

The great vice of the period following the Middle Ages was the overindulgence in liquor, and the university students were no freer from this vice than were other classes. The manners and morals of even the most intellectual people of that day would compare unfavorably with those of the lowest classes of today and, as we might expect, the drinking bouts generally

degenerated into carousals of the worst kind. Drinking played an important part in the social life of the student, and the successful accomplishment of the various stages of his career was celebrated by drinking parties and feasts. The collections of student songs of the time, known as the "Carmina Burana," contain a large number of songs devoted to the praise of wine or beer or of drinking in general.

Many of these festivities were innocent in character and have survived in the German student customs of today, where the "Kneipe" or drinking party is a regular part of the life of every student organization, and where every successful candidate for the doctors' degree regales his friends at his "Doktorkneipe."

The students of the university came from all classes of society, and many of them were very poor. We have already seen how the poorer scholars in the lower schools supported themselves by begging. This practice they probably kept up at the university or were supported in some cases by special funds created for the purpose. A famous story tells of three students who were so poor that they had but one "cappa" or gown between them, and who took turns in going in it to the lectures. A great many lived upon bread and porridge, with a little meat and wine of a Sunday, but similar tales of poverty can be found in any age, and the accounts of the enormous amounts of food and drink consumed at all feasts are not calculated to impress us with the belief that the students of those days were addicted to fasting. We hear many tales of the hardships of the student's life, and undoubtedly he enjoyed but little of what we call comfort; but it must be remembered that this was true of all classes, that glass windows did not become common until the fifteenth century and that stoves were not in general use till about the same time. Winter was therefore a time of great physical discomfort and even suffering to most classes in the Middle Ages. The lecture halls were not heated at all, the only warmth being supplied by the rushes with which, as was the custom, the floor was strewn in lieu of carpet. At Leipsic we read that it was customary to eat the meals in the kitchen in winter for the sake

of warmth. The students were not supposed to have fire in their bedrooms, and a periodical inspection was made to see that the rule was enforced. Many statutes denounce the practice of resorting to the kitchen fire for warmth. At Padua the windows were enclosed with linen, and in 1463 the first glass windows were introduced at the University of Prague. As late as 1598 some of the rooms in King's College at Cambridge were lacking in this convenience.

The inventory of furniture at King's College enables us to obtain a fair idea of how the rooms of the students were furnished. The senior men had bedsteads provided with gorgeously colored coverlets, a pillow and, in some cases, curtains. The juniors often slept in trundle beds, which in the daytime could be shoved under the larger ones. There were generally a table and a few chairs, stools or benches. Mention is made in some cases of an iron cistern or a lead trough or of a pitcher and bowl for the purpose of washing. There was a chest or press for clothes, and if the student was studiously inclined, a press or shelves for books.

As yet I have said nothing of the studies pursued at medieval universities. It must not, however, be thought that they were only secondary in importance or that the majority of students were idle and turbulent fellows. The accounts which we have deal, to be sure, especially with the pranks and evil practices of the students, but that is because of the desire to correct them. The quiet, industrious student is not talked about as much as his mischievous comrade, but the quiet work he does is a greater factor in the development and advancement of the culture of his age, and he is remembered long after the other has been forgotten.

Taking up now the organization of the universities and the studies pursued, we find that the universities were looked upon somewhat like a guild or corporation composed of the teachers and scholars. The term "universitas" was used originally to designate any legal body and did not refer, as often supposed, to the universal character of the courses. Still the professors

were divided off much as today into the four faculties of arts, law, medicine and theology. Law was considered the leading faculty, but generally in each university some one faculty predominated; as, for example, law in Bologna, medicine in Salerno and theology at Paris.

The course in arts extended over three or four years and was divided by the first examination into two parts. The subjects first studied were logic and physics. When the student had attended the prescribed number of courses and taken part in a certain number of disputations, which were a very important part of the course, he received his first academic degree, the "baccalaureus artium" or bachelor of arts. After a further course of study lasting several years, in which he devoted his time to philosophy, ethics, metaphysics, astronomy, mathematics and political science, he was admitted to the degree of "magister artium." The last and highest degree was the doctorate. The threefold division into scholaris, baccalaureus and magister corresponded to that of apprentice, journeyman and master workman. Just as the journeyman both learns and produces or even teaches while the master workman produces and teaches, so in the university the bachelors and masters were expected to devote a certain amount of their time to teaching. The number of regular professors was not large, but it was thus increased by the bachelors and masters. The result of this system naturally was that the students were often much more eager to learn than the teachers were to teach. The latter were also often quite incompetent, as no selection of the best was made, and they frequently sought to avoid teaching altogether.

In the south of Europe where, as in Bologna, the students as a rule were mature men, the custom arose of having the students select the teachers, determine the fees and the length of the term. This custom survived in Spain almost down to modern times, where the professors were not only selected by the students, but promptly discharged if they failed to attract a sufficient number of auditors. In the north of Europe,

however, following the example of Paris, where the students were younger, the reins of government were in the hands of the professors. We thus have a distinction between "student universities" and "master universities."

In the theological faculty the Bible was studied to some extent, but more especially the commentaries upon it, the dogmas of the church and the unwieldy system of scholastic philosophy which had practically been developed.

In law all instruction was based on the enormous compilations of Roman and canonical law and on the commentaries upon these. In medicine the works of Hippocrates and Galen and of their Arabian commentators were studied. In science the works of Aristotle were the final authority. No experiments were made—books were supreme—and no one dared to question the authority of the great masters. As late as the seventeenth century a doctor of medicine was compelled by the English college of physicians, under penalty of imprisonment, to retract a statement made in opposition to Aristotle. As a result, both in natural science and medicine, no real progress was made until we come down to the eighteenth century.

As already mentioned, disputations upon set subjects or theses were considered an essential part of the course. Their number was exactly prescribed and no one could graduate who had not taken part in the required number. They were not without their advantages, as they made a man nimble of wit, clever in argument and gave him a fluency of speech often lacking in the modern scholar. They also forced the student to have all his facts well formulated and ready for instant use and thus gave him a perfect command of his subject. The medieval university had, however, few facts to impart, and differed greatly in this respect from the colleges and universities of today which lay little stress upon turning out clever dialecticians, but rather men who have acquired either a broad culture or some special knowledge which they can put to good use in their chosen professions.

The danger of today, and especially of our country, however,

lies in overspecialization and especially too early specialization before a broad foundation has been laid. Let us guard against turning out mere human machines who know only their one subject and are interested in nothing else. Let us rather say with the old Roman poet: "I am a man, and nothing which concerns man is foreign to me." In this respect we can still learn from the medieval universities which sought to lay a broad foundation upon which the superstructure of special attainments could later be placed.

RADIUM AND ITS RAYS

By Horace C. Richards

Professor of Mathematical Physics, University of Pennsylvania

Some fifteen years ago great interest was aroused by the announcement of the discovery of a new element possessing very remarkable properties by which it differed from previously known forms of matter, and which was called Radium from its power of continuously emitting a peculiar kind of radiation. Especially during the last year or two has popular interest in this substance been intensified by the prominence given to the discussions of its use as a therapeutic agent and the consequent greatly increased demand for its production. The question of the conservation of the available sources of supply has even been raised in the halls of Congress, though no action has yet been taken.

I shall not attempt to discuss the question of its use as a curative agent. It has proved of value in certain phases of disease, though it has failed to accomplish all that was hoped for. It has its limitations and its dangers, which will be more thoroughly understood as experience grows.

From the standpoint of pure science the discovery of radium is of no less capital importance. Its study, with that of allied substances possessing similar properties, has in a few years revolutionized our ideas as to the constitution of matter and enlarged our views of the available sources of energy in the universe. The nineteenth century was the age of the modern atomic theory. Upon this splendid hypothesis of Dalton was reared the inspiring structure of modern chemistry, while physical science owes to this conception the mechanical theory of heat and the development of the law of the conservation of energy. But the foundation of this theory is the indestructibility of the atom. Not that the atom was regarded as the

hard structureless particle of the earlier speculations, for spectrum analysis had foretold that it must have a very complex structure; but its complete invulnerability to attack, by whatever agent, made it the ultimate unit in terms of which natural phenomena were to be interpreted. But within the last two decades our views have been profoundly modified. Not only have we penetrated deeply into the structure of the atom and discovered it composed of entities incomparably smaller, but the fundamental conception of the immutability of the atom has been shaken and the dream of the alchemists—the transmutation of the elements—has become a matter of daily observation in our laboratories. And this great progress in our understanding of the structure of matter has been largely if not chiefly due to the study of radium and of the other radioactive substances.

In order to place ourselves in a position to appreciate the significance of the peculiar properties of radium let us first consider the meaning of the term ray. The rays we are most familiar with are the rays of light, which it is generally agreed consist of electromagnetic waves in an all-pervading medium called the ether, ranging in size from 0.00004 to 0.00008 cm. for violet and red light respectively, *i. e.*, from 1/60,000 to 1/30,000 of an inch. This visible spectrum has been extended in both directions, for it is shown that rays exist both shorter and longer than visible rays, but identical with the latter in all particulars except in wave length. Thus shorter waves called ultra-violet waves have been observed of one quarter the length of the visible waves, while the longer infra-red waves or heat waves may be several hundred times as long.

The length of a light wave, small though it be, is readily determined. To accomplish this we make use of a structure which approaches in fineness that of the quantity to be measured. Such, for instance, is the diffraction grating—a series of closely and uniformly ruled lines on a transparent or reflecting surface, which sifts the different wave lengths from one another and arranges them in a spectrum in which each wave

length may readily be determined. In the colors produced by the tenuous film of the soap bubble we see evidence of the same sorting effect of a structure comparable with the light waves.

But light, visible or invisible, is not the only phenomenon to which the term ray is applied. Of greater importance to our present discussion, because more analogous with the radiations of radium, are certain effects observed in the electric discharge through rarefied gases. Let us therefore briefly consider these rays and their nature.

The electric discharge through gases ordinarily produces a continuous luminous track between the positive and the negative poles. This is seen at atmospheric pressure in the electric spark, or at lower pressures in the glow discharge of Geissler tubes. The lightning flash and the polar aurora are demonstrations of the same effect in Nature's laboratory. If, however, the gas is at very low pressure—of the order of a millionth of an atmosphere—this luminous effect almost vanishes and the discharge appears to consist almost wholly of faint luminous rays which leave the negative pole or kathode perpendicularly and travel in straight lines without reference to the position of the positive pole. These from their origin were named the kathode rays. They have been known for over half a century, though their nature long remained a mystery.

When these rays fall upon the glass walls of the discharge tube they produce a greenish fluorescence. Many other substances are similarly affected by their impact. They also produce considerable heat at the point upon which they fall. They darken a photographic plate in the same way as light rays. They will pass through a thin sheet of aluminum foil and in this way were obtained by Lenard outside of the discharge tube. Their passage through a gas, which is ordinarily a non-conductor of electricity, renders it conducting by producing in it charged particles or ions.

These effects are to a greater or less degree shared with

some kinds of light waves. The kathode rays differ from the latter, however, in being deflected by a magnet or by an electric field. This effect gives a clew to their nature and indicates that they consist of a stream of electrified particles which are emitted from the kathode with high velocity. The epoch-making experiments of Sir J. J. Thomson have shown that these particles are in all cases identical in size and in charge, and are much smaller than atoms. Their mass has been found to be about 10^{-27} gram, or 1/1800 of that of the hydrogen atom, their diameter perhaps a hundred thousandth of that of an atom. Their speed is enormous, varying with the conditions of the experiment from 7,500 to 100,000 kilometers per second, or from 1/40 to 1/3 of the speed of light. From the direction of their deflection they are found to be negatively charged, and in fact they constitute the electrons or atoms of negative electricity.

Another form of rays less familiar than the kathode rays but associated with them are the so-called Kanalstrahlen or canal rays. These are formed when a perforated kathode is used, the rays being projected through the holes in the kathode, in a direction away from the positive pole. Their properties are similar to those of the kathode rays, though they are less intense. They are deviated in the opposite direction by a magnet, proving that they are positively electrified. Measurements have shown that they are atomic in size, being never smaller, and sometimes larger than a hydrogen atom. Their velocity and their penetrating power is less than that of the kathode rays.

The third and most recently discovered type of rays observed in the vacuum tube discharge is comprised of these known from their discoverer as the Röntgen rays, or more commonly as the X-rays. These are formed wherever the kathode rays impinge upon an obstacle. They have much greater penetrating power than the kathode rays, so may readily be obtained outside of the discharge tube. Like the kathode and canal rays, they produce fluorescence and act upon a photographic

plate. They also produce ionization and so render conducting the gas through which they pass. In one essential point, however, they differ: they are not deviated by either a magnetic or an electric field. In this they bear a greater resemblance to light rays, from which they differ in selective penetrating power—a property utilized in radiography and in therapeutic operations.

On account of their undeviability it is clear that the X-rays do not consist of a stream of charged particles. It was early suggested that they were pulses or extremely short waves in the ether produced by the sudden stopping of the kathode particles, just as when hailstones fall upon a roof each impact is the source of a sound pulse which spreads through the air. This view has been strengthened by recent experiments which have shown diffraction effects like those produced by light. The ordinary diffraction grating is too coarse to produce this effect; a much finer structure must be used. This is found in the molecular arrangement of a crystal, where the layers of molecules are evenly spaced and the dimensions are a thousand times smaller than a light wave. X-rays reflected or transmitted by a crystal form diffraction patterns analogous to those formed by a ray of light transmitted through crossed gratings, and the wave length has proved to be a thousand times smaller than a light wave.

Thus, to sum up, in the electrical discharge in high vacua we meet with three types of rays: First, particles of atomic size, positively charged—the canal rays; secondly, much smaller particles negatively charged and of greater penetrating power—the kathode rays; and finally, ether pulses or groups of waves of very short wave length and still more penetrating —the X-rays. We shall find all these types represented in the rays emitted by radium.

After the discovery of the X-rays in 1895, attempts were made to find other sources of this new radiation. It was thought that if X-rays produce fluorescence, perhaps fluorescent substances would produce X-rays. This led Professor

Henri Becquerel in the following year to the discovery that a phosphorescent salt of the element uranium possessed the property of continuously giving forth radiations which in some respects resembled the X-rays, as they acted on the photographic plate and discharged an electroscope. He later found that these rays were in no way connected with the phosphorescence, so that the discovery of the new property of radioactivity, as it is called, was in a sense accidental.

Examination of different compounds of uranium and of the metal itself showed that the emission of the rays was a property common to all, and that it did not depend upon the chemical character of the compound, but was in all cases proportional to the amount of the element uranium present. It was thus shown that this radioactivity is an atomic property, specifically belonging to the element uranium itself.

The discovery of the radioactivity of uranium led to the search for the same property among the other elements. In only one case was the search successful. It was found by Schmidt and Mme. Curie that thorium, another rare element (compounds of which are present in the ordinary incandescent gas mantles), emitted radiations very similar to those of uranium. Much later the elements potassium and rubidium were found to be radioactive, but in a much smaller degree.

But if search among the known elements was not very fruitful, the investigation resulted in the unexpected discovery of new elements which possess this discovery in an enormously greater extent. It was noticed by Mme. Curie that some of the uranium ores were more radioactive than even the pure metal. As the property had been shown to be atomic, it was inferred that there must be other elements present in the ore that possess the property to a greater extent than uranium. This led to an extensive chemical research, which resulted in the discovery by M. and Mme. Curie of two new elements which were much more radioactive than uranium. Of these the first was named *polonium* from Mme. Curie's native country, while the second was happily named *radium*. The

next year a third substance was discovered by Debierne and named *actinium*. These substances are found in extremely small quantities; in fact, the only one which has been obtained in sufficient quantity in a pure state to study in detail is radium, which may be taken as a type of the radioactive substances.

Radium may be obtained from a number of different minerals, uraninite or pitchblende, carnotite, etc., and is always found associated with uranium. The amount of radium in a mineral is about 1/3,000,000 of that of uranium—a ratio which is nearly constant for a great variety of minerals. To procure a gram of radium would require the analysis of about five tons of uraninite, or over 2,000 tons to obtain one pound. This accounts in part at least for the high price of the substance—the market price at present being $120 per milligram, or say $50,000,000 a pound.

Radium is an element closely resembling barium in its chemical properties. It has been obtained in the metallic condition and found to be a white metal melting at about 700° C., which energetically decomposes water. It is usually prepared as the chloride or bromide. Its atomic weight is 226. It has a characteristic spectrum similar to that of other homologous elements. In fact, it has all the characteristics of a true element. So doubtless we should find the other radioactive substances if they could be isolated in sufficient amount. In its distinguishing property of radioactivity it is several million times as powerful as uranium.

In addition to the usual properties in which it resembles other elements, radium possesses three remarkable properties—it continually emits heat at a constant rate, it is the source of the radiation to which it owes its name, and it generates a gas which is itself radioactive. These properties are not independent, but are closely related, as will be seen in the sequel.

First we shall consider the generation of heat. One gram of radium continuously emits heat at the rate of 135 calories

per hour; in other words, a sample of radium emits sufficient heat to melt twice its own weight of ice every hour, or an amount equal to that produced by the combustion of its own weight of coal every 2½ days. To put it in another way, a pound of radium, if we were fortunate enough to possess it, would emit energy at the rate of 1/10 of a horse-power. Here is an enormous and practically inexhaustible storehouse of energy. For this development of heat continues year after year, and it is estimated that the total heat emission of one pound of radium is equivalent to that produced by the combustion of 250 tons of coal.

Let us now turn to the rays of radium. These possess the characteristics of the radiations we have considered before, though on account of the small amount of substance available they are much less striking. A photographic plate exposed in the dark will be affected by a salt of radium even if it is protected by a screen opaque to visible radiation. Again a sample of radium brought near an electroscope will discharge it by ionizing the air. A number of substances become luminous when exposed to the radiations. Salts of radium are themselves self-luminous from the phosphorescence produced by the radiations on the crystals and on the surrounding gas. The rays will produce various chemical actions. For instance, water is decomposed into oxygen and hydrogen when exposed to them. The glass tubes in which samples of radium are preserved are deeply colored by the action of the rays, an effect similar to that produced by prolonged action of sunlight or X-rays. The physiological effects are also similar. Thus the prolonged handling of tubes containing radium is apt to produce burns similar to X-ray burns. The therapeutic action also seems in general analogous.

Examination of the radiations shows that they are complex in character, being a mixture of various types differing widely in penetrating power. For convenience these types have been named by Rutherford the alpha, beta and gamma rays. Thus some of the rays are completely stopped by a sheet of writing

paper or a thin metal foil. These were called by Rutherford the alpha rays. Of the more penetrating rays which are practically unaffected by this screen, a portion is stopped by a lead screen a millimeter thick. These are called the beta rays and are about 100 times more penetrating than the alpha rays. Finally there is left a third still more penetrating type of rays, the gamma rays, which will pass through over ten centimeters of lead. As another comparison, it is found that the alpha rays will travel but three inches in air, the beta rays about twenty-five feet, while the gamma rays will travel half a mile.

The alpha, beta and gamma rays are not rays of one kind differing in penetrating power, but they are of three entirely distinct types. This is most easily seen by examining the effect of a magnetic field. The alpha rays are deviated by the field in the direction which indicates that they are positively charged particles. The beta rays are bent much more and in the opposite direction, indicating a negative charge, while the gamma rays are unaffected by the field. The alpha rays are therefore analogous to the canal rays, the beta rays to the kathode rays, while the gamma rays correspond to the X-rays.

The alpha rays, because of their low penetrating power, may be observed only if the radioactive substance is uncovered. As has just been stated, they may be deviated by a magnetic field and are thus shown to consist of positively charged particles. Their charge is found to be numerically twice that carried by an electron or by a hydrogen atom in electrolysis, their mass is four times that of a hydrogen atom. The same value is obtained when alpha particles from the other radioactive elements are examined. The speed of emission is about 2×10^9 cm., or 1/15 of the velocity of light, and is identical for all alpha particles emitted from the same substance. Different substances, however, emit alpha particles with different velocities and hence with different penetrating powers.

An interesting illustration of the action of the alpha rays of different range is found in the so-called Pleochroic halos, small

microscopic discolorations of a spherical form found in some rocks. These have been shown to be due to the presence of a minute speck of radioactive material imbedded in the rock, which emits alpha rays in all directions and so produces a spherical discoloration. From the size and character of the halo the nature of the radioactive material may be inferred. Often several concentric rings are seen, showing the different ranges of the alpha particles.

Some beautiful experiments of C. T. R. Wilson show the paths of the alpha rays. By cooling moist air to supersaturation, minute drops are formed on the ions which are set free by the alpha particle in its flight, and thus the track is rendered visible. These experiments have proved a complete confirmation of Rutherford's theory as to the ionizing action of an alpha particle.

When the alpha rays fall upon a phosphorescent crystal such as zinc sulphide, they produce a luminosity. Observation with a microscope shows that this is not uniformly distributed, but consists of a series of flashes from points distributed over the surface. It has been shown that each flash is produced by the impact of a single alpha particle, and further, when the screen is properly prepared every particle produces a flash. This gives us a means of actually counting the number of alpha particles emitted and it has been found that 1.43×10^{11} are given off by a gram of radium per second. This seems a very large number. It is in fact inconceivably large. But it is also true that the particles are so small that the total mass emitted per second is less than a billionth of a gram—a number as inconceivably small as the other was large.

Still we have here an emission of particles of atomic size which in time should accumulate to a measurable amount, and the question arises, what is the nature of these alpha particles? The answer is suggested by three facts: First, the mass of an alpha particle is just equal to that of an atom of helium, a rare gas which exists in small quantities in our atmosphere and in that of the sun. The second point is that helium

is detected in gradually increasing amount in radium preparations. Finally, helium alone among the gases occurs in considerable quantities in rocks which contain radioactive substances, and to nothing like the same amount in other minerals. It is difficult to account for its presence except by supposing that the element is produced in the rock and is unable to escape,

The identity of the alpha particles with helium atoms was conclusively shown by Rutherford, who arranged an experiment in which the alpha rays entered an exhausted space completely shut off from access of gases, and which was originally entirely free from helium. In two days a trace of helium was detected by the spectroscope, and in a week the whole spectrum of helium was observed.

This conclusion is confirmed by the comparison of the observed rate of production of helium with that predicted by the theory. If the number of alpha particles emitted by a gram of radium per year is compared with the number of helium atoms in a cubic millimeter of gas, which is known to be 2.71×10^{16} (from results of Millikan on the charge of an electron), we find that 166 cu. mm. should be produced every year. The most recent experiments by Boltwood and Rutherford show an actual production of 164 cu. mm. per year.

It is thus clearly established that the alpha rays consist of helium atoms. They differ, however, in their high velocity, and in carrying an electric charge which is found to be twice the unit charge, *i. e.*, twice the charge carried by a hydrogen atom. After losing their excessive velocity by impacts and having their charge neutralized by attracting to themselves two negative corpuscles or electrons each, they form normal helium gas.

I have dwelt upon this transformation at some length because here we have a phenomenon which does not fit into our old conceptions of the permanence of the elements. Here we have an element—helium—continuously produced by matter in which it did not previously exist. For the source of the emis-

sion of the alpha rays is itself an element in which no trace of helium can be detected. We shall presently see how light is thrown upon this remarkable effect in the further study of the properties of radium.

We are now in a position to explain the spontaneous generation of heat by radium. These alpha particles are projected with considerable energy, which, by collision with the substance itself or with the surroundings, is converted into heat. If we calculate the kinetic energy of an alpha particle from its observed mass and velocity, and multiply by the number of particles emitted per hour, we obtain a value of about 118 calories. This agrees very closely with the experimental value of 135 calories which is reduced to 123 calories when allowance is made for the effect of the beta and gamma rays. We see then that the generation of heat by radium is mainly due to the kinetic energy of the alpha particles.

Let us turn now to the beta rays, or rays of mean penetrating power. These form the principal part of the radiation from a specimen that is covered or enclosed in a glass tube. They are deflected by a magnet much more than the alpha rays and in the opposite direction, showing that they are negatively electrified. The mass and charge are found to be identical with those of the kathode particles or electrons, *i. e.*, they have 1/1800 the mass of a hydrogen atom (1/7200 the mass of an alpha particle) and carry a single unit of negative charge. Their velocity, however, is greater than that of the kathode rays, varying from one-third of the velocity of light upwards, until the swiftest rays are found to have a velocity but little less than that of light itself. In spite of this high velocity—five to fifteen times that of the alpha particles—their mass is so small that the momentum and energy are much less. They are therefore much less efficient than the alpha rays in producing ionization in a gas. They are also more readily deflected by a collision with an atom.

Study of these high-speed electrons has brought out the remarkable fact that their mass is not constant, but increases

with the velocity. This has thrown much light on the relations of electricity to matter, but it would lead us too far from our subject to pursue this thread further.

Finally, we have the gamma rays, the most penetrating type. These are not affected by the magnetic field, consequently they do not consist of charged particles. Their properties are the same as those of X-rays, though they are more penetrating than the latter. When reflected from a crystal they exhibit similar diffraction patterns, which indicates that, like the X-rays, they consist of very short ether waves. Their wave length is still less than that of the X-rays, or about 10^{-9} cm.

Just as the X-rays are produced by the kathode rays in the discharge tube, so the gamma rays are supposed to be due to the beta rays. There is this difference: The X-rays are produced by the stopping of an electron, the gamma rays by the starting. An ether pulse, however, is to be expected whenever a charged particle is either started or stopped, and, in fact, gamma rays are also produced, exactly like X-rays, by the impact of beta rays upon matter. It is probable that gamma rays, though of much weaker intensity, also accompany the emission and the impact of the alpha particles.

The activity of the gamma rays, like that of the beta rays, is much less than that of the alpha rays. Indeed, it has been shown that they themselves produce little or no ionization, but that this is mainly a secondary effect. The gamma rays, falling upon the molecules of the gas or upon the walls of the enclosure, produce beta rays, and it is to these that the chief part of the ionization is due.

We come now to the third and most interesting property of radium—that of emitting a radioactive gas. If a radium salt is dissolved in water and then boiled, the gas that is driven off (consisting mainly of dissolved air with oxygen and hydrogen formed by the radium) is found to be itself radioactive. The effect when not fully understood was said to be due to an "emanation" from the radium. It is now proved that the radium emanation is a powerfully radioactive gas, which is

present in minute quantity in the radium and which is driven off by the boiling.

The total quantity of emanation obtained from one gram of radium amounts to 0.6 cu. mm., or about 0.006 mg. This quantity is used as a standard in radioactive measurements and has been appropriately named a *curie*. In spite of the fact that the amount of this gas available in an experiment would form a bubble about the size of a pin's head, it has been purified and its properties determined. The density of the gas is found to be 111 times that of hydrogen, or about eight times that of air. It is the heaviest gas known. It does not form chemical compounds, in this resembling helium and the other inert gases. If, like these, it is monatomic, it has an atomic weight of 222, four units less than radium. It may be liquefied by pressure or by cooling, as with liquid air. It has a characteristic spectrum entirely different from that of radium. It is in fact a bona fide element just as much as radium, and has been added to our list of elements under the name of niton. It is, however, usually referred to as the radium emanation.

The emanation is enormously radioactive. It is, in fact weight for weight over 100,000 times more active than radium itself. It may be calculated that a cubic foot of the emanation would generate heat at the rate of 8,000 horse-power. Fortunately or unfortunately, we are not likely to be able to avail ourselves of such a dangerous source of energy, as the preparation of this amount of the gas would require some fifty tons of pure radium. Even in the minute quantities available and diluted with millions of times its own volume of air, it is a powerful source of radioactive energy.

The most remarkable property of the emanation and the one most important to our understanding of radioactive processes has not yet been told. If a quantity of emanation is kept in a sealed vessel so that none can escape, its activity is found to gradually decrease. The law of its decay is a simple one. After about four days it has lost half of its activity. After an equal interval it has again lost half of the remainder, and so on,

so that in about a month it has all but disappeared. And not only the activity but the emanation itself vanishes at the same rate. Its volume decreases, and its spectrum becomes weaker and finally is replaced by that of helium due to the emitted alpha rays. Here we have an element that is essentially unstable. And yet it should be added that no chemical or physical agency is able to produce the slightest effect upon the characteristic properties of the emanation. It may be heated to 1,300 degrees or cooled to the temperature of liquid air, it may be liquefied or frozen or diluted with a million times its own volume of air, but its activity is unaltered and it continues to decay by exactly the same law and at exactly the same rate as before.

Since the emanation decays so rapidly, it cannot have a long previous history, but must be continuously produced by the radium. And this is found to be the case. If the radium salt is examined after all the emanation has been removed, it is found to emit practically no beta or gamma rays, while its alpha ray activity falls to twenty-five per cent of its former value. From this it is seen that the major part of the activity of radium is due not to the element itself but to the emanation which is contained in it. But after being freed from the emanation the radium increases again in activity and at exactly the same rate at which the emanation decays, so that in a month the radium is practically as active as before. It is then found to contain a quantity of emanation equal to the original amount, and the process may be repeated indefinitely, every month a new portion of emanation being formed. There can be no accumulation of the emanation, for this decays as rapidly as it is formed, whether removed from the radium or not. If left in the radium, a balance will be obtained, as in a community where the birth rate and death rate are equal. The radium and the emanation are then said to be in radioactive equilibrium. As before stated, the amount of emanation in equilibrium with one gram of radium is called a curie.

In seeking an explanation of these facts let us bear in mind

first that the radiation of a radium salt depends in no way upon the chemical combination of the radium, but is a property of the radium atom; secondly, that the radium, of atomic weight 226, is ejecting alpha particles or helium atoms of atomic weight 4, and finally that simultaneously a new element is formed by the radium, of atomic weight 222. One cannot escape the conclusion that we have here an atomic disintegration. A certain definite fraction of the radium atoms breaks down each second. The decomposition of an atom is like an explosion. A portion of the atom is hurled out with great velocity, forming an alpha particle and later an atom of helium. The remainder of the atom, which has lost four units of its mass, is no longer a radium atom mass 226, but a new atom of mass 222. The chemical and physical properties of a substance depend upon its rank in the series of the elements. It is not, therefore, surprising that the emanation is so different in nature from its parent substance. For example, caesium, of atomic weight 133, is metallic like radium, while xenon, two units less, is an inert gas similar to the emanation.

We may put this theory to the test by a simple calculation. We have seen that the number of alpha particles emitted by a gram of radium per second has been determined by direct counting to be 1.43×10^{11}. Of these, one-fourth, or 3.57×10^{10}, are due to radium itself when freed from the emanation, so that this number represents the number of radium atoms disintegrating per second and the number of emanation atoms formed. Now when in equilibrium with radium the growth of the emanation is equal to the amount which decays, and this is known to be one-half in nearly four days, or about 1/480,000 per second. The amount of emanation present in radium should, therefore, be 480,000 times the growth per second, or 1.71×10^{16}. Since 1 cu. mm. of the gas would contain 2.71×10^{16} atoms, the total volume of the emanation present per gram of radium should be 0.63 cu. mm. But this is precisely the amount that has been found by experiment. It is thus

conclusively proved that for every alpha particle ejected from radium an atom of emanation is formed.

This theory opens interesting vistas in many directions. Thus it is seen that radium itself is not a permanent element, for a radium atom disappears each time an atom of emanation is formed. But as there is only 0.006 mg. of emanation to a gram of radium, the fractional loss for the radium is less in the same proportion. We therefore find that instead of four days it would take 1,800 years for radium to be reduced to half its quantity, and 13,000 years before it would have practically disappeared.

It is not possible to directly observe this small rate of decay of radium. Indirect evidence has given a value which agrees well with that calculated above. It is comewhat comforting to know that our investments in the metal will not suffer rapid deterioration.

But the decay of radium carries with it as a corollary the evidence of its continuous growth. For it could not have existed in its ores for the geologic ages during which they have lain in the earth. Take, for instance, the case of uraninite which contains about a fifth of a gram of radium per ton. If this rock had been composed of pure radium 45,000 years ago, there would today remain no more radium than we find at present. But the rock is known by geologic evidence to be hundreds of millions of years old. Any radium formed in it at the time of its deposition must long since have utterly disappeared. We must infer, therefore, that in such rocks the radium is present in constant quantity, in equilibrium with a parent substance, just as the emanation is in equilibrium with its parent radium.

It was at first thought that the sought-for parent of radium was the metal uranium, which is itself radioactive. This inference was strengthened when it was shown that the amount of radium in a rock is almost exactly proportional to the uranium present. However, experiments made to detect the growth of radium from uranium gave negative results, although extended

over a period sufficient to have given measurable effects. Now the atomic weight of uranium is 238, or 12 units greater than that of radium. The transformation would require the emission of three alpha particles instead of one. If this took place in successive stages, at each stage a new element would be formed and the formation of radium thus delayed. This explanation has proved to be true, and uranium found to be not the father but the great-great-great-grandfather of radium. The true father of radium was discovered by Boltwood in 1907 and named ionium. There has recently been added a great uncle to the family.

These intermediate products, and other products formed by the decomposition of the other radioactive substances, have not been obtained in sufficient amount to be examined with the care bestowed upon radium and its emanation. The essential characteristics of their growth and decay have been determined by the variation of their activity, which is the most delicate test of matter known to science. The character of the transformations of these and other radioactive products is found to be in all cases the same. An atom of a substance undergoes an explosion by which a particle is projected from it and the remainder becomes a new substance. When an alpha particle is ejected the new substance is of lower atomic weight. If a beta particle is ejected, the atom does not appreciably alter in atomic weight, but its chemical properties are changed. Occasionally we find that an atom may decompose in either of two ways, by the projection of an alpha or a beta particle. In this case the result of the decomposition will be a mixture of two distinct substances.

Each substance has its own rate of decay by which it may be identified. This rate varies greatly, ranging from ten thousand million years to a five hundredth of a second, and a product has recently been detected in thorium whose period is estimated by indirect evidence to be of the order of a billionth of a second. Yet all these substances, of which some thirty are now known, obey the same law of growth and decay. Their activity is as

varied as their length of life. Comparatively inactive substances like uranium last for millions of years, while the quickly decaying substances exhibit powerful radioactivity. Their activity is in fact at the expense of their existence.

> "These violent delights have violent ends,
> And in their triumph die."

We have traced the origin of radium back to its beginning in uranium. Let us now inquire as to its end. It has been shown that the radium atom is decomposed, forming an atom of emanation. But the emanation is itself violently radioactive and soon decays. The question naturally arises as to the result of its disintegration.

It is found that the surface of bodies exposed to the emanation becomes coated with radioactive matter, which rapidly loses its activity. Experiment shows that this matter is very complex in its nature, but the genius of Rutherford was able to disentangle the complicated experimental results. He showed that the emanation, like radium, emits alpha rays only, producing the active deposit. This is composed of successive products, named radium A, B and C, respectively, of which radium C has since proved itself made up of three components. After being separated from the emanation the activity of all these decays in a few hours. When radium is in equilibrium with its emanation and radium A, B and C, we find alpha particles emitted in equal amount by radium, the emanation, radium A and radium C. Radium B is transformed by the emission of beta and gamma rays only.

A feebly active product results from the disintegration of radium C, which continues the series through radium D, E and F. Radium F is of interest for two reasons. It is the last radioactive product in the series and it has been identified with the element polonium found by Mme. Curie in the ores from which radium was later extracted. Polonium or radium F emits alpha rays and decays to half in 136 days. No trace of radioactive substance has been found resulting from its decay.

What is the final transformation product of the series? It must be either an inactive substance or one with activity too feeble to be measured. Its atomic weight may be estimated to be 20 less than radium, or 206, since five alpha particles are emitted during the various transformations of the radium atom—by radium itself, the emanation, radium A, C and F.

The element whose atomic weight is nearest to this number is lead—207—and it is a fact that lead is found in all uranium minerals, in amounts which are proportional to the probable age of the rock. These observations point to the suggestion, first made by Boltwood, that lead is the result of the disintegration of polonium and the final product of the radium series.

An attempt has been made to test the question directly by examining the spectrum of polonium as it decayed, and the spectrum of lead (always present because of impurities) seemed to grow more intense as the polonium decreased. A repetition of this experiment with larger quantities of polonium is now being carried out in the laboratory of Mme. Curie, and we may expect soon to have a definite answer to the question. We shall then have traced the history of the radium family without a break through fifteen generations from uranium to the final product. Similar genealogies of the thorium and actinium families have been worked out, although they are not so extensive.

The study of radioactivity thus leads us to a more intimate knowledge of the structure of the atom. In the alpha and beta particles we see the units, the positive and negative constituents of which it is in part at least composed. The researches of Rutherford have led him to conclude that an atom is composed of a concentrated positive nucleus surrounded by a neutralizing shell of negative electrons. From time to time, governed by laws that we do not yet understand and which we cannot control, if the element is radioactive, an explosion takes place in the nucleus and a portion is ejected, forming an alpha particle. Or perhaps an electron is hurled forth and a beta particle is emitted. In either case the atom changes its character and

becomes a new element. Such a picture, modified though it may be in detail by future discoveries, is a fairly consistent representation of an atom which may be drawn from the study of the radioactive transformations.

The question naturally suggests itself as to whether these new elements fit into the accepted series known to chemists as the periodic series. Recent work by Soddy and others has led to a generalization that throws light on this point. It has been found that each element is characterized by an integer (called its atomic number) which, even better than its atomic weight, fixes its position in the table. This number is supposed to represent the number of units of positive charge on the nucleus of the atom. The discharge of an alpha particle would diminish the atomic number by two, while the loss of a beta particle, which is equivalent of the gain of a single positive charge, would increase the atomic number by one. The successive changes in the properties of the radioactive elements are found to agree with this hypothesis.

Now when we calculate the atomic numbers, we find that several elements, although of different atomic weights, have the same atomic number. Thus radium B, radium D, and the end product of the series, of atomic weights 212, 208, 206, have the same nuclear charge. Elements belonging to such a group are called *isotopes*, as they fall in the same place of the periodic table. Now the physical and chemical properties of isotopes are apparently identical, so that they can be distinguished only by their varying rates of decay. We are thus led to fix our attention upon the atomic number, rather than the atomic weight, as the true characteristic which determines the properties of an atom. If these conclusions are verified—and no experimental evidence has yet appeared to controvert them—an important addition is made to the theory of the atomic structure of matter and of the radioactive transformations.

One of the most important stimuli to scientific investigation in the middle ages was the hope of discovering the secret of the transmutation of metals—the philosopher's stone which

was to transform base metals into gold. With the rise of modern chemistry and the development of the atomic theory, such a search came to be thought as vain and foolish, as were schemes for producing perpetual motion or attempts to square the circle. But here we have before us undoubted examples of such transformations. The theory of the indestructible atom gives place to the theory of atomic disintegration.

One thing, however, should be emphasized in this connection. While we have learned to observe such transformations, we have as yet no clue to their control. The radioactive processes are not influenced by any agency that we can discover—even by the most powerful, the exposure to the action of the radiations themselves. By no means at our command can we in the slightest degree modify the rate at which these marvelous changes take place. Like the stars in their courses they move on—"without haste, without rest," and we can but look on and wonder.

ANATOLE FRANCE

By J. P. Wickersham Crawford

Professor of Romanic Languages and Literatures, and Director of the University of Pennsylvania Summer School

It is somewhat presumptuous to discuss the works of a living writer, for we know how frequently in literary history posterity has modified or reversed the verdict of an author's contemporaries. The task is difficult, too, because during an author's lifetime the external facts upon which his biography must be based are usually lacking. It is true that in the case of Anatole France we have two autobiographical works, "My Friend's Book" (Le Livre de mon Ami) and "Pierre Nozière," in which he describes with little attempt at concealment his early years, but even these do not furnish us the material for a complete biography. We must therefore content ourselves with attempting to sketch his spiritual and intellectual development which is so faithfully reflected in his novels and literary criticisms. Yet even here we are baffled, for at various times he reveals himself to us as a poet with exquisite perfection of form, a dilettante with ardent love for the literature of the past; an indulgent sceptic who looks upon human frailty with Olympian indifference; a mystic who naïvely evokes the poetry of primitive religions; a sentimental rationalist who saps the foundations of belief with a devout smile; a voluptuary; a keen critic of theological dogma; a bitter anti-clerical and zealous supporter of the separation of Church and State; a Socialist and eloquent champion of the rights of the people; a learned historian; a Rabelaisian short-story writer, and a scoffer who laughs with Mephistophelian mockery at all things, human and divine; these are the moods which are presented to us in their kaleidoscopic variety as we read his works.

Anatole François Thibault, better known to the world by his pen-name of Anatole France, was born at Paris in the year 1844, in an old building on the Quai Malaquais. This street, overlooking the Seine, the "river of glory" as he affectionately calls it, has ever remained his favorite spot in Paris. As a boy he became acquainted with the shops that line the street with their treasures of old prints, antique furniture and rare editions, and with the book-stalls ranged along the parapet, exposed to sun and rain, save for the protecting screen of lofty poplars where the venders, weather-beaten like old statues on cathedrals, expose their spiritual wares. In after years, lamenting the changes which have transformed the quays, he writes: "There one feels more keenly than elsewhere the labors of past generations, the progress of the ages, the continuity of a people, the sacredness of the work accomplished by our ancestors to whom we owe liberty and the leisure for study. It is there that the mission of Paris to teach the world appears most vividly to me."

His father, Noël Thibault, was a dealer in old books whose shop was a meeting place for bibliophiles, writers and artists. His mother was a pious woman of mystical temperament who stirred the boy's imagination with stories of devout men and women of bygone days who had tasted the joys of martyrdom. With delightful naïveté, he evokes the recollections of his childhood in "My Friend's Book," composed at the age of thirty-five, when he had reached the middle of life's path, as he says, quoting the first line of Dante's Divine Comedy. Before he was able to read, he thirsted for fame and longed to make his name immortal. "Had I been able," he says, "I would have gone out to win immortality on the battlefield, but I had neither horse, uniform, regiment nor enemies, all of which are essential to military glory. That is why I determined to become a saint. It requires less equipment and is more worthy of praise." Imitating the ascetic practices of the holy men of old, he refused to eat, distributed his pennies to the poor like St. Nicholas of Patras and mounted the kitchen pump in emulation of St.

Simeon Stylites, who had lived on a pillar, but his father, "not being a saint," was unable to understand the boy's new vocation and he was obliged to desist, remarking philosophically "that it is difficult to practice sanctity in the bosom of one's family." It is interesting to note that his interest in the artless stories of ascetics and hermits has never flagged. In "Thaïs" and in countless short stories he delights in reproducing those ingenuous religious emotions which appeal to the mystical side of his nature.

At the Collège Stanislas, where he took his Bachelor's degree, he became acquainted with the masterpieces of Greek and Roman antiquity. He was fond of Vergil and Livy, but it was Homer, Sophocles and Euripides who opened to him a magic world of heroes and heroines. In "My Friend's Book," he pays this tribute to the value of classical studies: "I believe that to form the mind, nothing equals the study of Greek and Latin antiquity, according to the methods of the old French humanists. That fine word, humanities, is not too fine to designate the arts which make a man in the highest sense." In the same volume he acknowledges the influence of classical training in the formation of his own style. "I had in those days," he writes, "a liking for correct Latin and correct French which I have not lost in spite of the advice and example of my more fortunate contemporaries, and I have remained classical in my tastes. I may be treated as an aristocrat and mandarin, but I believe that six or seven years of literary culture give to the mind, prepared to receive it, a nobility, an elegance and beauty which cannot be obtained by other means."

At the Collège Stanislas, he became acquainted with clerical discipline and theology which produced upon him the same effect as it did upon Renan. His loss of faith probably dates from this period. In one of his later books, "The Elm-tree on the Mall," the principal of a seminary, fearing for the orthodoxy of one of his pupils, declares: "It is in the temple itself that the hammers were forged which overthrew it. Such is the power of theological discipline that it alone is capable of rearing great

sinners; an unbeliever who has not passed through our hands is powerless and without weapons for evil." Before long the Church realized that in Anatole France it had reared an enemy as dangerous as Renan himself.

While acknowledging his indebtedness to the systematic instruction he received at college, he confesses that he derived more profit from the book-shops on the quays, which were to him a true open-air school. "Simple-hearted booksellers, my masters, how grateful I am to you! You have given me my intellectual education even more than the professors at the University. You displayed before my delighted eyes the mysterious forms of life that is past and the precious monuments of human thought. It was in searching your boxes, gazing at your dusty stands, laden with the poor relics of our fathers and their beautiful thoughts, that unconsciously I became imbued with the most wholesome philosophy."

After receiving his degree, he spent many happy years without writing, "leading," he says, "a contemplative and lonely life." He attended, however, the Ecole des Chartes, where the study of medieval literature claimed most of his attention. In 1867 he was admitted to the circle of the Parnassian poets under the leadership of Leconte de Lisle and wrote a considerable amount of verse at this time which is characterized by elegance and good taste rather than by its lyrical quality. His poetry met with little appreciation from his Parnassian friends, and he soon became estranged from them, but it interests us, aside from its cold beauty, as the first literary manifestation of a combative instinct, which makes less strange his later participation in the discussion of contemporary questions. In 1868 he had published a critical work on the poet Alfred de Vigny in which he practised his own theory of impressionistic criticism. In this spirit he wrote incomparable prefaces for editions of Racine, Molière, La Fontaine, "Paul and Virginia," the works of Bernard Palissy and Benjamin Constant's "Adolphe." These studies show exceptional literary versatility and give evidence of erudition and sensibility of a high order.

His first ventures in fiction appeared in the year 1879 with the titles "Jocasta" (Jocaste) and "The Famished Cat" (Le Chat Maigre). The former is an ugly bit of bourgeois tragedy, written under the influence of the brothers De Goncourt; the latter a joyous picture of the Bohemians who met at the Sign of the Famished Cat and who have all the earmarks of genius except the power to create. Never shall we forget the sculptor Labanne who must read treatises on the pigmentum of the black races and fifteen hundred volumes before he can touch clay for his statue of the Black Liberty. The book is undoubtedly a reminiscence of the noisy meetings of the Parnassians, and in certain respects may be regarded as a satire on the literary and artistic ideals of his old associates.

The first fruits of his genius were far surpassed by the publication in 1881 of "The Crime of Sylvestre Bonnard" which established his literary reputation. The title leads us to expect a melodrama, and after all, Sylvestre Bonnard is a criminal, but the most charming criminal in fiction. An old scholar and member of the Institute, his household is admirably regulated to allow him to pursue without interruption his studies in medieval history. His housekeeper, Thérèse, who needs but two volumes for her soul's happiness, her cook-book and breviary, looks after his bodily needs with maternal solicitude. His constant companion is his cat, Hamilcar, who guards the shelves of this City of Books, laden with precious tomes, against the visits of prowling rodents. A long life of incessant deciphering of old texts has carried him far from the interests of everyday life, yet he is intensely human and sympathetic toward those who suffer. The even tenor of his life is broken by the news that a manuscript which he needs for his studies is in the possession of a dealer at Girgenti. Against the protests of his prudent housekeeper, he sets out at once for Italy, and "like an owl bewildered by sunshine," he mingles with the gay throng on the Strada di Porto at Naples, which displayed such artless delight in the simple act of living. His mission proves unsuccessful, but he finally receives the manuscript as a present

from a woman whom he had once befriended. This forms the first part of the story. It has little organic connection with what follows, but Anatole France is more interested in giving a picture of the old scholar than in worrying about questions of technique.

Throughout his long life devoted to textual criticism and historical study, the old scholar had cherished the memory of Clémentine, a young girl whom he had known many years before. She had passed out of his life after her marriage, and he had learned of her death, but in his thoughts he had ever remained faithful to her. While cataloguing the library of a friend in the country, he meets Jeanne, the granddaughter of Clémentine. He learns that she is poor and he determines to devote himself to her interests, which, after all, he thinks, is more important than wearing his life away on old books. The sight of a bee sipping honey from a flower awakens his interest in the mysteries of nature. "Like Antæus of old, he has touched the earth and become a new man; new feelings of curiosity take birth in his mind even as young shoots sometimes spring from the hollow trunk of an aged oak."

His crime consists in rescuing Jeanne from the hands of a precious pair of rascals, but happily this abduction of a minor, so severely punishable according to the Code, had no serious consequences. After being appointed her guardian, in due legal form this time, he consecrates himself to her happiness, and finally consents to her marriage with a young student whom he had once overheard talking so flippantly of the unscientific methods of the historians of his own generation. But there was another crime which Bonnard almost commits in planning to reserve a few of his treasured volumes when he decides to sell his library in order to provide a dowry for Jeanne. At the end of the story, we see him engaged in writing a book on insects and flowers, surrounded by the young people whom he had made happy by his sacrifice.

Nowhere in literature can we find a more charming portrait of the scholar and specialist. By dwelling constantly in the

past, the range of his interests has become restricted; he is too far removed from the passions of the crowd to be affected by them, yet he has the simplicity of a child, and once brought into contact with life, he shows that the spring of human sympathy has not been drained by his long association with books. The story is evolved from the man's inner consciousness, and seems to represent at the same time his ideal of the scholar's life and the emptiness of an existence devoted exclusively to study.

"The Aspirations of Jean Servien" (Les Désirs de Jean Servien), which appeared the following year (1882), describes the vague longings and voluptuous dreams of a young man of eighteen, educated above his station, whose will power and moral fibre have been atrophied by excessive reading of a desultory sort in which his sensitive nature found a refuge from active life. Certain incidents justify our belief that it is largely autobiographical. If we remember that a few years later he wrote, "To live is to act, but unfortunately the speculative turn of mind unfits men for action," we may suppose that the author intended to express in this work the danger of undisciplined thinking. Throughout the book there is a disquieting undercurrent of sensualism which is only partially justified by the nature of the psychological problem involved. It betrays immaturity compared with the "Crime of Sylvestre Bonnard" and probably was written several years before its publication.

The novels of Anatole France rarely give evidence of creative power as that term is usually understood in fiction. He is at his best in reproducing the spirit and state of mind of past epochs. With the intellectual curiosity of a dilettante, he is attracted by history, philosophy and religion. Although himself without faith, he is infinitely successful in seizing all the delicate shades of popular creeds. No other writer has realized so well the literary possibilities in the legends of saints and martyrs. His lack of system, of which he himself boasts, is well illustrated by the amazing variety of the stories included

in the volume entitled "Balthasar" (1889), ranging from the original conception of one of the Wise Men in the story of that name to "The Red Egg," a study in abnormal psychology, and the charming fairy romance "Honey Bee."

In "Thaïs" (1891) he undertakes to reconstruct and interpret the beginnings of monasticism in Upper Egypt and the conflict of the various philosophical schools at Alexandria in the latter half of the fourth century of the Christian era. In the medieval collections of lives of saints, he had read the story of the fair actress of Alexandria who was brought to God by the pious St. Paphnutius. Anatole France was acquainted with the medieval versions found in the Vitae patrum, Legenda aurea, Acta sanctorum and in the dramatic Paphnutius of Hrotsvitha, a nun of the tenth century, and he also utilized the studies of Amélineau and other scholars on the origins of Christian monachism in order to secure a fitting background. With marvelous skill he transformed the simple story into a romance of incomparable beauty.

When the story opens, the Abbot Paphnutius is living in a little community of cenobites in the Thebaid, following the example of St. Pachomius. With his companions he devoted himself to all sorts of ascetical exercises and austerities. Constantly assailed by the spirits of evil, this courageous athlete of God invariably routed his enemies because the sign of the Cross was upon him. One day he recalled that while a youth he had known at Alexandria a beautiful actress named Thaïs, who was living in sin. His heart is filled with pity for so fair a creature and he determines to reclaim her to God. He sets out for Alexandria, which he now detests because of its wealth and learning, and on his arrival, borrows a rich tunic and money to enable him to carry out his pious project. After witnessing with horror a play in which Thaïs appears, he goes to her home, declares to her that he loves her, in spirit and in truth, and promises her ineffable happiness if she will renounce her evil ways and follow him. Thaïs is carried away by the burning eloquence of the monk, his triumph being rendered less difficult

because he had come at a moment when she was satiated with life's pleasures and longed for rest. She promises to accompany him to a convent, on the condition that he will attend with her a banquet which his old friend Nicias is giving that evening.

The description of the banquet is a vivid reproduction of the religious and philosophical ideas dominant at that time in Alexandria. Each of the guests represents some particular philosophy of life and their conversation embodies the salient characteristics of many beliefs and creeds. Nicias himself is a voluptuary and scoffer, to whom the systems which philosophers have constructed to explain the world are idle dreams, yet withal amusing. A high priest of Serapis, an Epicurean, a Stoic, a Gnostic and an Arian discuss in turn those absorbing questions of the truth of religion which have always occupied the mind of man. Paphnutius listens with horror to their blasphemies and steals away at the first opportunity, accompanied by Thaïs. He insists, in spite of her weak protests, that she burn everything which connects her with her sinful life, and when this is accomplished, he leads her across the desert to a convent where he entrusts her to the pious Abbess Albina. He then returns to his cell, exultant in having brought to Christ a straying lamb.

Anatole France was not satisfied, however, with the dénouement of the story as related by the medieval monks. Having described the victory of good over evil, he ironically narrates the triumph of the flesh over the spirit. Paphnutius has saved the soul of Thaïs, but has lost his own. He is unable to banish her from his thoughts, and when he realizes that his fancied security against the assaults of the Evil One is vain, he subjects himself to the most rigorous penance and self-mortification. Emulating the example of St. Simeon Stylites, he goes out to the desert and mounts a pillar where, exposed for many days to the burning sun, he attempts to banish all worldly thoughts in the contemplation of God. Pilgrims are attracted from far and near to witness his austerities, miracles performed in spite of himself add to his fame, yet the unhappy monk can find no

peace for his soul. He escapes from his place of torture, and while wandering in the desert, he learns that Thaïs is at the point of death. He hastens to the convent, where he finds the sisters chanting beside her. Maddened, he cries, "I lied to you, Thaïs; let us live and be happy. Let us make haste and enjoy this world; all the rest is deception." But he comes too late. Thaïs dies, and Paphnutius is driven away because of his sacrilege.

We find in Anatole France a curious combination of spirituality and iconoclastic philosophy, with the heart of St. Francis and the head of Epicurus. "Thaïs" illustrates admirably this twofold personality. In the first part, he interprets the saintly aspirations of the monks of the Thebaid; in the second, his critical faculty reasserts itself to mock this ardor, apparently proving it to be sterile, after all.

The same interest in primitive religious emotions and psychic phenomena is found in the collection of sketches which appeared in 1892 with the title "The Pearl Case" (L'Etui de Nacre). In "The Procurator of Judea" he attempts to measure the unimportance which the ministry of Jesus assumed in the eyes of Pontius Pilate; three of the stories narrate in artless style the missionary labors of saints of the fourth century, while "The Juggler of Notre Dame" describes the reward of a simple-hearted monk who worshiped the Virgin in his homely fashion. "The Mass of Ghosts" is a supernatural tale in the style of Alphonse Daudet, and "Leslie Wood," inspired by the experiments of Sir William Crooks, is a rather unsuccessful venture into the domain of spiritism.

Intellectually, Anatole France is a child of the eighteenth century, and this period is the background for "The Cook-Shop of Queen Webfoot" (La Rôtisserie de la Reine Pédauque), published in 1893, and named from the shop where the characters sometimes met. The book is a sort of fantastic biography of an imaginary eighteenth century priest, Jérome Coignard, told by his devoted pupil, Jacques Tournebroche. In the course of the narrative we meet with strange characters, the Marquis d'Astarac, a young nobleman who devotes himself

to the study of Rosicrucian doctrines and alchemy, and the old Rabbi Mosaide, a Kabbalist, who explores ancient Hebrew writings, Egyptian hieroglyphics and Gnostic treatises in order to re-establish the true meaning of the Pentateuch. The author shows that he was well acquainted with the literature of the Rosicrucians and alchemists, but we would gladly forego all this nonsense about the Elixir of Life, the Philosopher's Stone, elves, gnomes and salamanders in order to have more of the discourses of the Abbot Coignard as he drinks his pint at the Petit Bacchus or turns over a volume of Cassiodorus at the book-shop of Monsieur Blaizot.

Coignard is a philosophical rascal, a sort of Voltarian Falstaff. Deeply versed in theology, his advancement had been checked by his many slips from the path of virtue, yet he does not despair, for he knows "that we all participate equally in the original curse." A reprobate who only too often stoops to actions ill befitting his ecclesiastical state, he stands firm in matters of faith, justifying his position by arguments which at first sight appear orthodox enough, but which in reality sap the foundations of belief. Judged by present-day standards, the abbot is immoral, but we almost forgive him because of his gentleness and kindliness. It is unfortunate that the book is marred by salacious incidents which we would like to overlook, but one of these offers an excellent example of the subtle humor of Anatole France. The abbot has participated in a shameful orgy, ending in a quarrel in which his nose suffers considerable damage. He manages to escape from the scene of the affray, and breathless, covered with mud and bleeding profusely, he stops beside a watering trough, partially lighted by a street lamp. He has tasted misfortune to the very dregs, but his philosophic attitude of mind does not desert him. He takes from his pocket a volume of Boethius, his ever-present companion, and begins to read the treatise on The Consolation of Philosophy.

We can find no coherent philosophic system in the utterances of Coignard. As Anatole France himself said of him, "He was

lacking in that precious illusion which sustained Bacon and Descartes, of believing in himself after having lost faith in everyone else." Far removed from Rousseau and the doctrines of the Revolution, he believed that man by nature is a wicked animal; yet his contempt for mankind is not bitter, his irony is benevolent and indulgent. Spiritually akin to Epicurus, he is wholly lacking in a sense of respect, and with the aid of a deep store of learning he mildly combats prejudices of every sort.

Coignard typifies eighteenth century ideas, but he resembles far less the passionate Voltaire than he does Pierre Bayle, the author of the "Philosophical Dictionary." Like Bayle, he is without convictions. Both reveal a highly developed intellectual curiosity, but without any fixed purpose. Like Coignard, Bayle shows the fallacy of all prejudices, leaving nothing standing but reason, and then slyly adds that reason too is futile, only more flattering than other superstitions. When Coignard says to his pupil, "Jacques Tournebroche, my son, always bear in mind that a sound intelligence rejects everything contrary to reason, except in matters of faith where it is necessary to believe blindly," he makes the same dextrous thrust at religion which Bayle had struck home before him. Nowhere else is the humor of Anatole France more subtle, nor more sombre. The book is filled with laughter; at times we hear the boisterous rollicking born of wine, but more often the hollow laugh of the sceptic.

"The Opinions of Jérome Coignard," which appeared in the same year (1893), is a criticism of contemporary society. With smiling iconoclasm, long respected prejudices are carted away to the rubbish heap of exploded superstitions. The desire to kill and plunder, which is inherent in man, is varnished over with the name of glory and honor, and war will only cease when the tremendous increase in armaments will bring about the death of the monster from excess of nourishment. He would agree with Shaw that "war is simply a letting loose of organized murder, theft and piracy on a foe," and that "the

slave code called military law is mischievous, dishonorable and tyrannical." In his eyes, "military service appears to be the most frightful plague of policed nations." Nor does he spare the august body to which he was to be elected four years later. "Mediocrity triumphs at the French Academy, for after all, it does not take an exceptional man to work at a dictionary which attempts to fix usage and can only follow it." There are few truths in history, he says, "and the only facts on which we agree are based upon a single source." Quoting an old story, he declares that the history of the world is contained in these words, "They were born, they suffered, they died." Revolutions and proposed reforms are only calculated to deceive generous spirits.

His attack upon time-honored institutions and beliefs is made with Shavian deftness, but he confesses that he is not a man of action and that he is unable to suggest any remedies. "I am aware," he writes, "that my mind is spoiled by meditation. And since it is not in the nature of man to think deeply, my tendency to speculation is an inconvenient form of mania. It makes me unsuited to any form of undertaking, for only men of limited intelligence can act. It would be impossible for me to undertake a great task, for I would discover in every act reasons for me to stop." Then turning to Tournebroche, he adds ironically, "It is a great infirmity to think. God preserve you from it, my son, as he has protected his greatest saints and the souls whom he cherishes with especial tenderness. Men who think little, or not at all, are happy in this world and in the next, while thinkers are constantly threatened by both temporal and spiritual destruction. Remember that the Serpent of Genesis is the oldest of the philosophers and their eternal prince."

At the close of the book, however, he seems to realize that contradiction and denial can accomplish nothing. "Tournebroche, my son," he says, "you see me suddenly become uncertain and embarrassed at the very thought of correcting what I detest. Do not attribute this to timidity. Nothing

checks the audacity of my thought. But take heed to what I say. Truths detected by the intelligence will ever remain sterile. The heart alone conceives dreams. It pours the water of life upon everything it loves. Seeds of good are sown in the world by the feelings. Reason has no such power. Since I have followed overmuch the dictates of reason in my criticism of laws and manners, my judgment will fall without fruit and will wither as a tree bitten by April frosts. To help mankind, one must reject reason and rise on the wings of enthusiasm."

If we expect to see Anatole France, in accordance with the promptings of his heart, lay before us a constructive scheme for the regeneration of society, our expectation is disabused by the title, "The Garden of Epicurus" (Le Jardin d'Epicure) of his next volume which was published in 1893. It is a series of chats on love, death, science and poetry, pervaded with a note of cheerful melancholy and ironic resignation. He had apparently given up at this time the Darwinian doctrine of evolution upon which he had based his hopes as a young man. With an astounding power of vision, he pictures to us the last man, freezing wretchedly to death when the sun is black as an ember and the earth a lump of ice. With philosophic despair he declares "that our whole solar system is one vast gehenna, where animal life is born, only to suffer and die." His attitude is one of absolute negation. "It is plain," he says, "that we can know nothing, that all things combine to deceive us, and that Nature is only making sport of our ignorance and helplessness." The one compensation for life is intellectual curiosity, and our chief duty is to feel pity for the sufferings of man.

He also shows himself entirely out of sympathy with Zola and the other French naturalists who believed that the value of a literary work depended upon its approximation to scientific accuracy. Anatole France had no interest in this pseudo-scientific literature. "Truth," he says, "is not the objective of Art. That is the end and aim of science; literature can have no other objective than beauty."

"The Red Lily" (1894) is a voluptuary's dream of beauty

and the author's sole attempt to describe the smart set of Paris. The chief character is a wealthy woman who, without moral support, is tossed about in the whirlpool of her own passions, striving with the energy born of despair to fill the emptiness of her own heart. Women of this kind have been only too frequent in French fiction since the days of George Sand, yet she interests us because of the author's subtle analysis of her temperament. Her lover is a spiritualized hero of a novel of Bourget, who combines in himself a keen desire for plastic beauty and something of the mystical tenderness which Dante felt for Beatrice. The story is commonplace enough in its immorality, but neither Bourget nor D'Annunzio is capable of writing that last scene when Jacques realizes that his idol is made of clay, and turns his back upon her.

The vagabond poet, Choulette, who appears from time to time in the story, is said to be a portrait of Verlaine, and is a reminiscence of the old days when Anatole France attended the noisy sessions of the Parnassian poets at Lemerre's book-shop. He is a genius, picturesquely homely, amusingly mad, typifying the eternal youth of the poet and artist. He has learned much from suffering and his heart is filled with the simple love of St. Francis for the outcasts of society. He undoubtedly gives expression to the author's social ideas when he remarks that "a poor man's civic duty consists in preserving the rich in their power and idleness. He must maintain the majestic equality of the laws which forbids the rich as well as the poor to sleep under bridges, beg in the streets and steal bread."

A part of the story is unfolded at the villa of Vivian Bell at Fiesole, thus affording a pretext for the author to write on Italy of the fourteenth century. We would be glad to forget the acrid sensuality which constantly obtrudes itself and remember only those beautiful Tuscan landscapes and the excursions to Santa Maria Novella, the Spanish Chapel and Convent of San Marco. Strangely enough, it is the spirit of Dante and of Fra Angelico which encompasses the voluptuous longings

of the chief characters. Vivian Bell herself is an Englishwoman who writes French poetry in the manner of Christina Rossetti and talks of art with the sentimentalism of Vernon Lee. A passage in "Penguin Island" shows that Anatole France had little sympathy for the ideals of the English Pre-Raphaelites and he probably satirized what he believed to be their insincerity and artificiality in the person of Vivian Bell.

"The Well of Saint Clara" (Le Puits de Sainte Claire), which appeared in 1895, is a collection of sketches with Tuscany of the fourteenth century as a background. Nowhere does Anatole France show himself more keenly sensible of the simple charm of that form of Christianity which springs from untutored minds, but his interest is solely that of a dilettante. Under a cloak of sentimental piety, this wolf in sheep's clothing expresses his unbridled sensualism and scepticism. He tells us the legend of Saint Satyr, whose voice murmured in the forest as a last sigh of the ancient flute; the "Decameron" is his source for the charming tale of Guido Cavalcanti, an early Italian poet and friend of Dante, who avoided the society of men and sought the truth in the writings of Epicurus, essaying the difficult paths by which man becomes immortal; from Vasari's "Lives of the Painters" he borrows the story of the painter Spinello, who is severely punished for having unjustly represented Lucifer with hideous mien, while "The Merry Jests of Buffalmaco" represent the burlesque side of fourteenth century Italy.

"The Human Tragedy," also included in this collection, is conceived with the artless simplicity of "The Little Flowers" of St. Francis, and concludes with the mockery of rationalism. Fra Giovanni was one of the most devout of the little band of brown brothers at Viterbo, who, imitating St. Francis, had espoused Lady Poverty. By the contemplation of the Cross he had learned to love God, and also to love destitute and suffering humanity. He feared to think, for thought is evil. One day he proclaimed the coming kingdom of God; since the earth is the Lord's and we are children of God, the share of each

must be equal. He is thrown into prison and tries to make the judges understand that he is the friend of all men. They regard such doctrines as dangerous and cast him once more into prison. Crushed by his misfortune, he listens to the sophistries of the Devil, who appears to him as a theologian. Truth, he learns, is unattainable and what we consider truth is contradictory. His simple faith is undermined by the ingenious arguments of his adversary and he renounces his old life, yet he feels no rancor against Satan, for although he suffers from his loss of faith, he has tasted the fruit of knowledge and loves him who has endowed him with reason.

We have seen that up to this time Anatole France was an indulgent yet detached observer of human frailty; a dilettante who delighted in reproducing the psychological state of mind of the past; interested in all ideas except present-day politics. Certain stories of "The Well of Saint Clara," such as "The Loaves of Black Bread," indicate a preoccupation with social questions, but they in no wise foreshadow the transformation of the Epicurean philosopher into a Socialist.

It was the Dreyfus affair which brought Anatole France from his study. It will be remembered that Dreyfus, a Jewish officer in the French army, was arrested in the year 1894 on the charge of having sold military secrets to Germany, and was found guilty by a court-martial sitting behind closed doors. The honor of the army was saved and the Anti-Semites, Nationalists, Clericals and Royalists took advantage of the verdict to further their own ends. The long story of the case, ending with the pardon of Dreyfus and his reinstatement in the army, need not be told, but it is interesting to note that Anatole France was one of a small group of intellectuals who consistently labored in his defense. At first sight it may seem incongruous to find the author of "The Crime of Sylvestre Bonnard" in the rôle of a social reformer, but his participation in the case becomes perfectly natural when we remember that he was lined up against enemies of long standing. An ardent anti-militarist, he resented the tyranny and injustice of the army; devoutly

grateful for the benefits of the French Revolution, he viewed with apprehension the growing power of the Royalists; believing in a weak form of government, he was bound to oppose the Nationalists, who wished to transform the existing parliamentary Republic into a dictatorial one; consistent throughout his life in his opposition to the Church, militant and aggressive, he feared the supremacy of the Papacy; and tolerant of all creeds, he resented the bigotry of the Anti-Semites.

The active participation of Anatole France in public questions is reflected in the four volumes of the "Contemporary History," the first volume of which appeared in 1897 with the title, "The Elm on the Mall" (L'Orme du Mail). The book deals chiefly with ecclesiastical politics in a small university town and the rivalry of Lantaigne, principal of a Catholic seminary, and Guitrel, professor of rhetoric, for the appointment to a vacant bishopric. Lantaigne, steeped in clericalism, has the uncompromising faith of a medieval theologian, while Guitrel coquets with the Prefect and his Jewish wife in order to secure advancement. Petty interests assume great importance in the life of this community which is intellectually starving. The Prefect, disdainful of Jew and Gentile alike, and his wife, a Jewess who has a passion for ecclesiastical bric-à-brac, are portraits worthy of Balzac. The interest is centered, however, upon Monsieur Bergeret, a professor of Latin, and a spiritual brother of Sylvestre Bonnard and the Abbot Coignard. He suffers from the tyranny and lack of sympathy of his wife and also because he is an object of suspicion to both Clericals and Republicans. He is an outspoken yet indulgent critic of society, interested as a philosopher in contemporary questions, but refraining from active participation. Disappointed and disillusioned, he found pleasure only in talking with Lantaigne, for they alone have an interest in general ideas. Besides, they have a common bond; both are dissatisfied with contemporary conditions. Lantaigne condemns the Republic as irreligious and hostile to the clergy. Bergeret assails the political domination of the triumvirate of priest, soldier and financier. He

considers war as a reversion to savagery. Aside from the perils of militarism and finance, the government of France suits him. "Her rule is lax and therefore she may be forgiven for ruling badly. Strong administrations make nations great and prosperous, but they bring untold misery."

The second volume of this series, "The Wicker Work Woman" (Le Mannequin d'Osier), which was published in 1897, takes its name from the dummy on which Madame Bergeret draped her dresses, and which stood bolt upright in the professor's study against learned editions of Catullus and Petronius, as a symbol of his wedded state. While the subject of the book is the unfortunate incident by which Bergeret was enabled to free himself from the tyranny of his wife, it is chiefly a commentary on contemporary questions. Speaking of the halo of glory worn by the soldier, he ironically remarks, "The least we can do is to flatter those whom we send out to be shot." In his eyes, the military code of law, "with its paraphernalia of death, should be seen no more, save in the chamber of horrors. Socialistic Europe will probably be friendly to peace," he asserts, "if indeed that unknown power which is approaching can be rightly called Socialism." As a philosopher, Bergeret regards it as our duty to make life endurable, if that be possible, but he himself has no faith in an approaching millennium. When he writes, "I would fain believe that organic life is an evil peculiar to this wretched little planet of ours," it is clear that he has not yet assumed the rôle of prophet of a new society.

The last two volumes of the "Contemporary History," "The Amethyst Ring" (L'Anneau d'Améthyste) and "Monsieur Bergeret at Paris," published in 1899 and 1901, deal almost entirely with the Dreyfus case. Bergeret, convinced of the injustice of which the unhappy officer has been made a victim, enrolls himself in his defense and is persecuted by the rabble carried away by the emotions of a day. The account of the intrigues by which the truth was so long concealed will prove of greater interest to the student of history than of literature. The delightful conversations of Bergeret with his dog Riquet

show the same tenderness and gentleness which inspired some of the earlier works. If Sylvestre Bonnard and the Abbot Coignard, in spite of his faults, are marked for immortality, we plead for a dispensation in favor of Riquet.

The Dreyfus case not only brought the dilettante into the street, but also broadened his literary sympathies. He even came to admire both the courage and literary work of Zola, of whom he had once said that he was one of those unhappy beings who should never have been born. The influence of Zola is clearly seen in the "History of Comedians" (Histoire Comique), published in 1903, which treats a pathological case similar to that of "Thérèse Raquin," one of the earliest works of the founder of French Naturalism. It is to be regretted that the book was ever written, for this sordid story of the green-room is far from pleasing. The subject is repulsive and the moral code, or rather lack of code, of Dr. Trublet, the author's mouthpiece, is detestable.

Social injustice is the theme of most of the stories included in the volume entitled "Crainquebille" (1904). The opening story of the poor pedlar Crainquebille is a bitter attack upon the so-called majesty of the law. In "Clopinel" he assails benevolence, declaring that true charity consists in living on the proceeds of one's own work and in the participation of all men in production and profits. If love and beauty is denied to the beggar, it is because he is the product of society. "Our pride was his father; our injustice was his mother. He is the bad fruit of our vices. Every man in society must give and receive. The beggar does not give enough because he has not received enough." In "Edmée, or Well-Directed Charity" (Edmée, ou la Charité bien placée), he bids the rich spare the poor their pity, which is contrary to the fraternal spirit. "It is not an affair of sentiment, but of economics. We should restore to the poor what belongs to them and thereby suppress poverty."

"The White Stone" (Sur la Pierre Blanche), published in 1905, contains two widely dissimilar stories, which reflect the

old and new interests of the author. In the first of these, entitled "Gallio," he returns to the *conte philosophique* and the contrast between Greek philosophy and Christianity. He takes as a basis the incident narrated in the Acts of the Apostle, Chapter XVIII, vv. 12–17, according to which St. Paul was accused by certain Jews of inducing men to worship God in a manner contrary to their law and was dragged before a Roman tribunal. When the Apostle is about to plead his cause, the proconsul, Gallio, refuses to hear their dispute, declaring, "If it were a matter of wrong or wicked lewdness, I would bear with you, but if it be a question of words, and names and of your law, I shall be no judge of such matters." The conversation of Gallio and his friends, rudely interrupted by the cries of the noisy crowd demanding the condemnation of Paul, recalls the banquet scene in "Thaïs." Educated Romans, they talk freely of art, philosophy, religion and politics, and show a constant preoccupation about the future destiny of Rome and of the world. Gallio tries to reconcile the doctrine of the Stoics with the national religion. He believes that religious ideas are transformed by various peoples and that the gods adapt themselves to the aspirations of their worshipers. He tolerates all creeds except that one which claims to possess a monopoly of the truth. He has no sympathy with the passionate earnestness of the Jews and cares naught for their petty quarrels. After refusing to hear the case of Paul, he explains to his friends that as far as he could understand the question, Paul had repudiated the religion of the Jews and worshiped Orpheus under a foreign name which he could not recall. Gallio had stood in the presence of the world power of the future, and with all his philosophy and learning had failed to recognize him.

"Through the Horn or Ivory Gate," included in the same volume, is a vision of a Socialistic society resembling in its general plan "News from Nowhere" of William Morris and the "Utopia" of Wells. A young man falls asleep one evening and awakens in the year 220 of the Federation of Peoples, or 2270

according to the old chronology. He is astonished by the changes undergone by the city. Tall buildings have been replaced by small brick dwellings reaching far out into the country; there are neither trains nor automobiles, but huge birds and enormous fish glide rapidly through the air. He finds a guide who takes pity on his ignorance and explains to him the new society. War had come to an end through an international federation of workingmen who would no longer endure the mad colonial policy of the various nations which had precipitated the last struggle. The capitalistic régime, a product of the nineteenth century, had represented great social progress, since it had made the workers an immense state within a state. Alcoholism had been suppressed toward the close of the twentieth century, for it was realized that an alcoholic working class could not free itself. At about the same time, the general situation was favorable to the general adoption of Socialism, because the standing armies had been replaced by a militia imbued with Socialistic ideas. The monarchies, left without defense, had become republics; frontiers had been wiped out by wireless telegraphy and aeroplanes, and the United States of Europe had been proclaimed. The new society was based upon public ownership of the means of production and the sharing of all men in the benefits derived from machinery. The absence of courts, commerce, and armies had sent the people to live in the country, thus increasing the production from the land.

We ask ourselves on reading this dream of the future state whether the author was sincerely converted to the ideas of Socialism or whether his interest in this was merely that of a dilettante. We are told that at this time he was actively engaged in Socialistic propaganda and we know that the following year he wrote a volume entitled, "Toward Better Times" (Vers les Temps Meilleurs), in which he stated categorically his belief in the collectivist community, but even with this evidence we may be justified in thinking that his interest arose from a sympathy for suffering humanity rather than from a

deep-rooted conviction that conditions would ever improve. Langelier, in commenting on this story of the new Atlantis, seems to express the author's attitude when he says, "I do not wish for the advent of Socialism, but I do not fear it."

In his "Life of Jeanne d'Arc" (1908), he returns to history and attempts to interpret the marvelous story of the Maid of Orleans and her age. The beginning of this study dates back to 1887 and the frequent references to her in the volumes of the "Contemporary History" show that the subject was constantly in his mind. Conceived in the spirit of Renan's "Life of Jesus," he makes her simple, intelligible and altogether human, while subjecting her and those of her contemporaries who had similar "calls" to the tests of psychology. It was inevitable that this iconoclastic though sympathetic portrait should provoke protests, for the French people did not relish seeing one of its popular idols reduced to human proportions. The accuracy of his facts was also called into question, but we will allow the historian to decide between the respective claims of Anatole France and Andrew Lang, whose biography appeared almost at the same time.

In the preface to "Penguin Island" (L'Ile des Pingouins), which was published the following year, he replied to those critics who believed that history is a barren mass of original documents instead of a picture pulsing with life. The historian of the Penguins, before undertaking his task, asks the counsel of learned archæologists and paleographers. They looked at him with a smile of pity, which seemed to say, "Do we write history? Do we try to extract the least bit of life or truth from a document? We stick to the letter. One must be conceited to wish to write history, for that requires imagination." He passes on to recognized historians, who are shocked that he proposes to write an original work. "Why write a history," they ask, "since it is so easy to copy those already known? If you have an original idea, you will surprise the reader, and the reader does not like to be surprised. An original historian is the object of universal scorn. Furthermore,

if you wish your book to be favorably received, do not fail to exalt the virtues upon which societies rest: attachment to wealth, pious sentiments, and especially resignation on the part of the poor, which is the basis of the social order." Fortified by this advice, Anatole France proceeds to narrate the story of the island of Alca.

"Penguin Island" is the *reductio ad absurdum* of the history of France and one of the cleverest parodies of human weakness since "Gulliver's Travels." Beginning with the time when the Penguins pass from the domain of zoölogy into history and theology, he describes their conversion by St. Maël, the difficult doctrinal question presented by the baptism of birds, their transformation into men, the institution of property rights and the events of the Middle Ages. The author seems ill at ease, however, in the medieval period and hastens on to the age of the philosophers, the French Revolution and the Napoleonic wars. On every page there is subtle criticism in the succession of miseries, crimes and follies which constitute the life of the people. The book becomes even more interesting when he describes the political events in which he himself had participated. The Dreyfus Affaire is described at length in the case of Pyrot, who is charged with selling eighty thousand trusses of hay intended for the cavalry to a neighboring nation, the Porpoises. Beside Pyrot we see Colomban, the author of sixty volumes on Penguin sociology, and in Bidault-Coquille, the student of asteroids, we recognize Anatole France himself. Bidault is disheartened by his contact with the prophets of progress; they are as ambitious and unscrupulous as his enemies. He does not give up his Socialistic ideas, but he seems to see their futility. Glad to escape from the crowd, he returns once more to his elevated perch to watch the heavens. "You imagined," he says to himself, "that at one stroke you could establish justice in your country and in the universe. You were a brave man, an honest idealist, but lacking the philosophy of experience. And now that you have lost your illusions, now that you know it is difficult to redress wrongs and that the task

is never finished, you go back to your asteroids. You are right; but go back to them with a humble mind, Bidault-Coquille." The Abbot Coignard had counseled Tournebroche to reject reason and rise on the wings of enthusiasm. Anatole France tried it but once and tumbled heavily.

A critic has said that "Penguin Island" is "the burial of an illusion," the hope in the ultimate regeneration of society. His prophecy of the future, contained at the end of the book, is the cruelest expression of his pessimism. He pictures to us a gigantic city, where fifteen millions of slaves toil under the rod of capital. Poverty has resulted in the physical exhaustion of the working classes. The multi-millionaire task-masters devote themselves entirely to business and seek no intellectual pleasures. Society has reached such a degree of artificiality that its destruction is inevitable. A powerful explosive reduces the great city to ruins so that even its site is forgotten. In the course of time, nomads come to pasture their flocks on the hills that cover the buried city; farmers turn up the fields with their plows; villages and towns are built; capital reappears; the city grows in wealth; fifteen millions of men labor in the giant town. Thus Anatole France describes the eternal flux—the Eternal Return.

"The Tales of Jacques Tournebroche" (Contes de Jacques Tournebroche), which also appeared in 1909, were probably written to afford the author some relief after the ghastly picture of society which he presents to us in "Penguin Island." They are unedifying short stories in which we miss the tenderness of the "Crime of Sylvestre Bonnard," and the sprightly merriment of "The Cook-Shop of Queen Webfoot."

His philosophy is that of absolute nihilism in "The Gods Are Athirst." Here he attempts to expose the folly of the French Revolution in wishing to establish the reign of virtue in this world. "When you wish to make men good and wise, free, temperate and generous, you are of necessity led to the desire to kill them all. Robespierre believed in virtue; he produced the Terror. Marat believed in justice; he demanded two

hundred thousand heads." He shows that, in spite of generous impulses, men are dominated by the primitive passions. We only catch an occasional glimpse of the leaders in the Reign of Terror. The chief character, Gamelin, is a young painter and juryman of the Revolutionary Tribunal. The everyday life of Paris of 1793 is presented to us; the people are weary of five years of excesses and are more attentive to the imperious call of hunger and sex than to the golden dream of fraternity; they are indifferent to the carnival of blood, for which the gods are athirst.

Brotteaux, an aristocrat and philosopher, who now manufactures dolls, is a combination of Abbot Coignard and Bergeret, and seems to represent the author's ideas. It must be admitted that the philosophy of this sceptic, who finds in atheism an abundant source of self-satisfaction, is tiresome. He is obsessed with the desire to mock and deny, and is unable to find in all the words of the philosophers an atom of common sense, yet he hypocritically repudiates any intention to attack religion. We are no longer interested when he tells us that "what we call morality is only a desperate attempt on the part of our fellow creatures to reverse the order of the universe, which is struggle, carnage and the blind play of hostile forces," since we have heard this same explanation too often in earlier works. In spite of the vigor of some of the descriptions, we feel in reading the book that the author is merely repeating himself and has nothing new to say.

"The Angels' Revolt" (La Révolte des Anges) offers sufficient proof that Anatole France in his old age has adopted the "flashy flippancy" of Renan's closing years. Frequent references to the theory of dualism in the creation, beginning with the publication of "Thaïs," show that his interest in this subject extended over many years. To him, Jehovah, the God of Judaism, is a cruel, selfish, overbearing demiurge, while Lucifer is the personification of science, progress and the human intellect, as pictured in Carducci's hymn to Satan. With contemporary Paris as a setting, he describes a conspiracy of angels to over-

throw the despotic Javeh. The less said about the book the better. The impertinence of the conception is manifest and the feverish sensuality of these very modern angels is revolting. The old attitude of pity and irony has given way to abuse and blasphemy. The "philosophic angel" has become Mephistopheles incarnate.

As a master of well-nigh perfect French, Anatole France can bear comparison with any writer of the nineteenth century. Endowed with amazing versatility, his style lends itself admirably to his varying moods. He can compete with Gautier in languid grace, with Flaubert and De Maupassant in accuracy and precision and with Bourget in his skill in psychological analysis. He obtains his effects without apparent effort, but this is only because he banishes from his work every trace of workmanship. "A good style," he writes in "The Garden of Epicurus," "is like yonder beam of light, which owes its pure brilliancy to the intimate combination of the seven colors of which it is composed. A simple style is like white light. It is complex, but it does not seem so. In language, true simplicity is only apparent, and springs merely from the fine co-ordination and sovereign blending of its several parts."

Anatole France is the most illustrious representative of that generation which was brought up on the philosophy of Taine and the scepticism of Renan, and which in early manhood shared in the spiritual depression following upon the Franco-Prussian war. He has been unable to adapt himself to the new spirit in France, which believes that purposeful energy can accomplish more than denial, and for this reason he occupies an isolated position in contemporary French literature. While all agree that his style entitles him to rank as one of the most distinguished men of letters of the nineteenth century, there are many who believe that he is a "corruptor as well as an educator," and that his dissolvent philosophy is subversive of all progress. The outcome of the war will doubtless decide whether French literature of the next decade will be one of hope or of doubt.

WHAT ORGANIC EVOLUTION IS NOT

By John Percy Moore
Professor of Zoölogy, University of Pennsylvania

One of the minor landmarks of the village of Woods Hole, Mass., is a weather vane upon which an ingeniously fashioned little wooden man waves his arms frantically as the wind blows. A few years ago a distinguished American zoölogist, watching this figure from one of the windows of the Marine Biological Laboratory, remarked, "I often think that I am like that little man; I spend much time waving my arms about my head, but seem to remain standing in one place."

Such, some critics would have us believe, is the case with biology as a whole. There has indeed been much activity during the past two decades. Popular magazines and the newspaper press have chronicled many epochal and revolutionary discoveries. But after all, may not these epochs be mere gusts of wind and the revolutions but those of the arms of a little wooden man on a weather vane? Some say yes, and some say no, and the educated but non-biological public may well be confused. Much, both of this activity and confusion, more or less directly concerns the doctrine of organic evolution—a matter of such vital importance to everyone concerned with improvement of the human race that the confusion is the more to be regretted.

To throw a little light upon the origin and nature of a few of the misconceptions arising from this condition and to suggest perhaps a few corrections is the purpose of this lecture.

The word evolution has been used with many meanings—common and technical. A comparative examination will probably show that, excluding special significations, all embrace the two ideas of continuity and change. The continuity of evolution is the continuity of law or natural process. The

change is dependent upon the nature of the things or categories concerned. The doctrine of organic evolution, with which alone we are now concerned, aims to explain how it happens that the animals and plants which people the earth today and all that vast host that preceded them in past ages, came to be what they are or were. The continuity of organic evolution is the continuity of the law of life: that present life comes only from pre-existing life. The change is that manifested in the reactions of an exceedingly complex and unstable chemico-physical organization standing in intimate relationship to a complex and itself changing environment. Simply then, organic evolution is genetic continuity with change. The many and complex secondary ideas connected with it need not now be considered.

To correctly understand the nature of organic evolution, it will be helpful if we abandon the point of view that too sharply separates organism and environment. The organism and its environment are both parts of phenomenal nature. While possessing a far greater spontaneity and independence than most other objects in nature, the organism is but a local focus of matter and energy similar to that surrounding it. Both matter and energy constantly flow into and out of the organism. The organism and its environment are in this sense continuous. We have been too much in the habit of thinking of the organism as the active, of the environment as the passive agent utilized by, if not actually existing for, the living organism. But perhaps the relation might better be compared to a chemical reaction or a complex series of reactions. When an acid and an alkali are brought together under ordinary conditions neither can be given precedence over the other. The reaction resulting alters both compounds; there is an interchange of chemical elements and a new balance is reached by the formation of other compounds, more stable under the existing conditions.

So a living organism may be thought of in relation to the environment. The organism is one set of reacting agents, the environment another or group of others. Of course there exist

differences, and profound ones, for, to alter Goethe's aphorism, protoplasm is a most peculiar juice, and most peculiar are its manifestations. As a result of the reaction the environmental complex is altered no less than the living complex. Both react and both suffer change. The attention of the biologist is centered upon the organism and organic response, and the importance of the environment as a reacting agent is too often ignored. It is one of the merits of the theory of natural selection in its original form that it postulates no mysterious hidden vital force as directing evolution. The controlling agency is the total environment which sets conditions that the organism must meet successfully in some way or perish. To live is to remain sufficiently in harmony with the environment, that is, to become adapted; to die means that the organism as a whole returns to the environment just as during life portions of it gradually and continuously return to the environment.

Ever since Charles Darwin in 1859 published his "Origin of Species" and placed the doctrine of organic evolution upon a firm basis, many books and pamphlets more or less bitterly antagonistic to his views have appeared. With the first flood of criticism during the 60's we are not here concerned. After a lull, marking the complete triumph of Darwin and his supporters, the last two decades have witnessed a renewed volume and virulence of these attacks. Books and papers have appeared in large number bearing such titles as: "Vom Sterbelager des Darwinismus," "Beiträge zur Kritik der Darwinischen Lehre," "Refutation of Darwinism," "No Struggle for Existence, No Natural Selection," etc.

Many such works have been written by serious students of biology—more or less authorities in their own fields and quite competent to deal with aspects of organic evolution. Following these publications, and influenced by them, have appeared magazine and newspaper articles, reviews and utterances from the pulpit and lecture platform proclaiming, often in tones of exultation, the decline and eventual abandonment by scientists of the doctrine of evolution. The newspaper press reports

the proceedings of scientific bodies under such headlines as the following: "Darwinism Repudiated," "Evolution an Abandoned Dogma," "British Scientist Reverses Darwinian Theory," etc., and the statement is often made and circulated with approval that "scientists no longer accept evolution" or have "given up Darwin's theory."

Now if we read the books referred to, and others like them, we learn to our surprise that the authors, with a few rare and scattered exceptions, are firm believers in the evolution idea. Whence then this widespread belief, ostensibly based upon their work, in its failure? The explanation is really very simple and has often been pointed out. It is based upon a confusion of a particular theory of evolution with the entire doctrine of evolution.

Previous to Darwin there were believers in evolution among advanced thinkers, and Lamarck had even developed a complete theory of organic evolution, but compared with the whole number of scientists their number was small and their influence even smaller. When, therefore, Darwin was ready to present his theory of natural selection, he found it necessary to prepare his public by first convincing it of the truth of evolution. So successfully did he accomplish this that to a majority of the non-biological public the doctrine of evolution dates from Darwin and is generally known as Darwinism or Darwin's Theory. But to biologists (including the authors mentioned) Darwinism is the name of a special theory of evolution advanced by Darwin and especially characterized by the prominence given to natural selection as a causal factor.

The attacks referred to are mostly attacks on Darwinism as understood by the biologist and not on Darwinism as understood by the public. They are directed against the theory of natural selection and not against evolution. In this respect they differ greatly from the early attacks against which Darwin himself had to contend.

Now look upon the reverse of the picture. There are many enthusiasts, chiefly public lecturers and popular writers, but

including some biologists of repute, who have much to say about the laws of evolution. They would give the impression that these laws are known and accepted. It is true that the idea of evolution is probably the widest scientific generalization that has been formulated. In the field of biology we do know the general sequence that the types and stages of life have followed in their successive appearance—the course of the stream of life in its varied branchings and changes to produce the plants and animals that people the earth today. We know some of the phenomena that have accompanied these changes of form and function. Perhaps this entire generalization may properly be designated the Law of Evolution, but, unlike the Law of Gravitation, it is far from capable of quantitative or mathematical expression.

So with the subsidiary laws of evolution. It is doubtful if any of them can be compared in definiteness and scope with the accepted laws of physics and chemistry. Of course, so far as living things are physical and chemical manifestations, the laws of these sciences are applicable and have their bearing upon the evolution of life. Most if not all of the so-called laws of organic evolution are more or less vague generalizations of more or less wide applicability. There are about a score of them. Two of the best known and most definite are Mendel's Law of Alternative Inheritance and Quetelet's Law of Variation.

Mendel's Law in its earlier and more conservative form is perhaps fairly comparable to Boyle's Law of the Volume of Gases, in that it is true within certain well-defined limits. Whether it is true in its expanded and elaborated form may well be doubted. In any event it has become so loaded with auxiliary ideas that if true at all it is as a loose aggregation of subsidiary postulates. This subject will be referred to at length later on.

Quetelet's Law, while true for the great class of indiscriminate variations, is after all only the application to biology of the mathematical law of probability or chance, and it has been denied even that the cases which it covers are immediately utilizable raw material for evolution.

Considering the present position of the doctrine of organic evolution as a whole, the truth would seem to lie, as Herbert Spencer would say, somewhere between the two extreme points of view. Evolution is not abandoned by its former sponsors; it is not on its deathbed; it is not even sick; if it suffers any pains at all, they are growing pains, for it is a great, growing, vigorous thought—the guiding principle of biology and the revivifier of all departments of knowledge. On the other hand, while the fact and much of the course of organic evolution are known, the method, the factors and the causes are not. Organic evolution has not yet been reduced to law, but the laws are being eagerly and persistently if not always patiently sought. The lawmaker of biology has not yet been recognized among us. Probably he is yet unborn.

A third widely held misconception that applies to organic evolution as a whole is that it always implies both progress and divergence. Nothing can be further from the truth if progress is used with the ordinary human implications of advance toward an ideal of perfection to something higher, nobler and better. Even if we think of evolution as concerning those organisms only that have survived and ignore those that have perished (a procedure wholly unjustified), we should find that the great currents of change lead not to progress but to adaption.

It is not denied that evolution involves progress. It does involve progress. It is also true that in every grade of development organisms are adapted. Each step offers additional opportunities and results in a more complex set of adaptations.

The responsibility for this error rests largely upon biologists themselves. With few exceptions our schemes of classification of animals have been pictured as ascending and diverging series with simpler animals at the bottom and the so-called higher animals arranged successively above them until man is reached at the summit of a central main stem. The non-biological reader naturally receives the impression that from the first appearance of life the attainment of the human form and endowments has been the aim and goal of evolution, and that

the main current has set continuously and irresistibly toward this end. Man is then taken as the standard of perfection, with reference to which all other animals are given a place high or low in the scale. In this interpretation all other animals are on side lines and fall more or less below the human plane. This view of the case may or may not be true, but it is a question of evidences and the facts of biology lend to it but scant support.

On the contrary, it is found that evolutionary change is characterized mainly by a molding of living organisms to meet immediate and not to anticipate future conditions of their environment. Thus are they fitted to live under those conditions and within a certain limited range to resist successfully the destructive influences surrounding them. This is adaptation and as a rule the most successful and dominant types of animals and plants are those that possess the capacity for adaptation in the highest degree. In general this leads to the development of more and more specialized structures and functions, which in turn entails lessened capacity for further adaptive evolution. Much of the diversity seen among animals and plants is of this character. A fact made very clear by the evidences of paleontology and history is that for continued adaptation and evolution we must look to generalized and not to specialized types. However, few if any animals or plants are generalized or specialized in respect to all or most of their parts or activities. As a rule, it is true that they are generalized in respect to some and specialized in respect to other features.

Evolutionary changes may be pictured like the branching of a tree as taking place in both vertical and horizontal directions, or, in reference to time, as both successive and simultaneous, or, again, as temporal and spacial. The changes of the first class may be either progressive, regressive, or for a longer or shorter period of time be arrested. In comparison with these, the horizontal, simultaneous or spacial changes are respectively divergent, convergent or parallel. Like the growth in complexity of the branching of a tree and like all

other temporal phenomena, evolutionary processes are irreversible. After a change in the direction of specialization it is probable that an organism can never again return to exactly its previous state.

Adaptation is said to be progressive when new structures resulting in elaboration and a greater complexity of the organism are being added. It is regressive (or retrogressive) when parts or organs or uses no longer employed are becoming reduced, vestigial or discarded. This condition is usually described as degeneration, especially when associated with the assumption of sedentary or parasitic habits. It results in simplification and the loss of parts. Both progressive and regressive adaptation lead to specialization and to either divergence or convergence, but neither is necessarily progress in the sense of leading to something higher. Many of the most degenerate and simplified parasites are among the most fully evolved animals in the sense of being very perfectly adapted and specialized.

Applying these principles to man, we find that Homo is the most highly specialized animal in respect to such features only as brain and mind, vocal organs, hand, social instincts and especially in his great adaptability and capacity for controlling and utilizing the forces of nature. In these respects there is, of course, a vast range of variation among individuals. He is much less specialized than the horse in structure of feet and teeth, than the dog in keenness of scent, than the cow in digestive organs, than the elephant in teeth and snout, than birds in power of aerial locomotion. Each of these and many other animals excel in some one or several features, and each is adapted to the peculiar conditions under which it lives. Man is dominant during the present geological period because his superior brain and mind enables him not only to adapt himself to his environment, but within certain limits to modify the environment to meet his needs and wishes. As to how long this fortunate position may be maintained, biology has nothing definite to say, but we may expect that the decline of the human species as a whole will date from the time when the supply

of generalized human stocks retaining a large capacity for adaptation will have become exhausted, if that time ever comes.

The main current of evolution has been, therefore, in the direction of securing fitness, not progress; and fitness may lead to simplification as well as complication. Some writers have preferred to use the term devolution for the former, retaining evolution to designate the latter. But biology finds no distinction in the essential nature of progressive and regressive evolution. The same forces and factors are believed to be effective in both.

Turning now from a few of the misconceptions concerning organic evolution as a whole to some misconceptions of secondary importance, we first consider some aspects of Darwin's Theory of Natural Selection, which affords an excellent example of the oscillation of belief. First put forward by Darwin as the chief sorting factor in evolution, a group of his overzealous coworkers culminating in Weismann, erected it to a position of omnipotence as the sole arbiter over the destinies of organic beings. A reaction then set in in the opposite direction, many biologists coming to deny to natural selection any efficacy whatever as a factor in evolution. Popularly, Weismann's extreme view of the omnipotence of natural selection seems to be most widely held, while biologists have mostly returned more nearly to Darwin's position, but with certain large reservations based upon more recent discoveries.

In the heyday of belief in natural selection, popular biological literature was filled with rhapsodies over the wonderful adaptations exhibited by animals and plants. Adaptation was found in every last feature of structure and habit, in every minute detail by which the systematist distinguishes his species, in every streak or spot of color of a flower or butterfly. Any suggestion to the contrary or failure to find usefulness was attributed to ignorance of the real facts. It is true that our ignorance of the details of life histories and many other features of plants and animals is still profound, but it is certain that a large proportion of the characters that distinguish species

as known are of no use whatever, at least to the extent of influencing the success of their possessors in the struggle for existence. The success of the politician is not determined by the fact that he has gray eyes and sandy hair, though his perpetual smile may help; nor did the passenger pigeon become extinct and the mourning dove survive because the former has twelve tail feathers and feathered tarsi and the latter fourteen tail feathers and naked tarsi. What is true of many specific and generic characters is equally true of many other large classes of characters.

The field of protective coloration has been the great playground for the extreme adaptionist school. There can be no doubt of the importance of the general principle. A gray and brown mottled moth quiescent on a tree trunk, or a green caterpillar resting on a leaf are certainly less conspicuous than if the one were pure white and the other red. But there are thousands of species of gray and brown moths and myriads of green caterpillars which have the habits indicated, and so far as observation or experiment shows, the numerous slightly different patterns are about equally effective. What value for concealment than can the details have?

Considerable experimentation has been done to determine the value of protective coloration, and the results have been more or less conflicting, but on the whole tend to show that it is less effective than is often assumed. Observation also shows that concealing color often fails to protect where it is most needed. The large tomato worm (*Protoparce quinquemaculatus*), the larva of a hawk-moth, is well known. It occurs in two colors, being generally green, almost exactly matching the tomato leaves and stems on which it lives, and more rarely brown and very conspicuous. These caterpillars may be observed to be not infrequently eaten by robins and cuckoos and pecked to death and partially devoured by chipping sparrows.

Last summer thirty-four of these caterpillars were counted upon a row of tomato plants. Of these, thirty-two were of the green and only two of the brown phase. Probably none of either color was overlooked, for the green ones are easily

found because of their habit of stripping twigs clear of leaves, causing them to stand out in sharp relief, and because of their large, almost black droppings, which accumulate on the leaves and ground beneath the caterpillars. Later in the summer the number of these caterpillars was observed to be gradually diminishing until in early September, when they had attained full growth, the green ones had been reduced to eighteen, while both of the brown ones remained. Furthermore, at this time it became apparent that no less than sixteen of the green caterpillars were parasitized by an ichneumon fly to whose attacks they eventually succumbed, with the net result that, in spite of being protectively colored, out of thirty-two green caterpillars at the beginning of the season only two—a number just equaling that of the unprotected brown caterpillars—survived to pupate with the latter.

Thousands of observations similar to the above show that coloration in animals is a complex phenomenon, and that while its explanation as a beneficial concealing device is an ingenious and in large part a correct hypothesis, its application in blanket form to unverified cases is unwarranted.

In one of his last lectures Professor Weismann, the late distinguished leader of the extreme natural selection school of evolutionists, states that he considers the facts of mimicry the strongest single piece of evidence for the sufficiency of natural selection to explain evolution. By mimicry is meant that because of its superficial resemblance to another animal endowed with some effective means of defense, the mimicking animal enjoys a protective advantage. It is the principle of bluff and fakery applied to animals in general. An inoffensive and unprotected fly remains unmolested, because it masquerades as a wasp bearing a powerful sting and advertised by showy livery. Or two animal species, both protected, may pool their interests and by adopting a similar dress or recognition mark, mutually advertise their formidableness. This is a basic principle of professionalism and many other protective devices in human society.

Such cases of resemblance are very numerous, especially among insects, and perhaps a few of them may be considered as fulfilling all of the requirements of the hypothesis. Where the resemblance is between two species living in widely separated habitats, as in the case of a caterpillar living on raspberry bushes in Delaware County, Pa., and an annelid living in deep water in the Pacific Ocean, the principle of mimicry, of course, cannot apply. But if convergence occurs under such diverse environments, may we not expect it to occur more frequently where conditions of life are similar? The proof that two forms exist in the rôles to each other of model and mimic is in most cases wanting, and until it is furnished these cases should be regarded as examples of simple convergence.

A third subject of great popular interest and a field usually regarded as dominated by natural selection is that of the mutual adaptation of flowers and the insects which frequent them. Flowering plants and nectar- and pollen-eating insects are believed to have appeared upon the earth and to have evolved contemporaneously. It is a well-established theory that many of their characteristics have arisen gradually through the modifying influences of each upon the other. Fortunately the careful and extensive experiments and observations conducted by Darwin and others have placed this theory on a secure foundation. But, as might have been expected, the idea has been overworked and it is sometimes stated that all floral structures and every detail of color and ornamentation of flowers have been modified with relation to the visits of insects.

It can easily be shown, as Darwin himself was aware, that many flowers produce seed quite as successfully when the access of insects is prevented. For instance, the pea flower and sunflower may be taken as examples of flowers possessing structures whose sole reason for existence has been attributed to their utility in attracting insects to insure the exchange of pollen and proper fertilization. Last summer numerous observations were made upon the conditions affecting the visits

of honey bees to a luxuriant bed of Russian sunflowers. Among other experiments the showy, strap-shaped corollas of the marginal or ray flowers of the head were removed. These flowers are infertile, and their sole function is supposed to be that of attracting insects, which then pollinate the other or disk flowers of the head. On this hypothesis, heads without ray flowers would be supposed to suffer a great disadvantage as compared with their intact neighbors. As a matter of fact it was found, when flower heads having disks of equal diameter and equally exposed to the light and other influencing conditions, were compared for equal periods of time, that the number of bees actually alighting upon the mutilated heads was reduced about forty per cent. However, what is important is how the production of seeds was affected. When the heads were shorn of ray flowers before the disk flowers had opened and become capable of fertilization by insect agency and were allowed to develop to full maturity, it was found that there was no diminution in number or size of the seed set as compared with normal flowers.

The three classes of facts last discussed: namely, those relating to concealing coloration, mimicry and insect modification of floral structures—and many others offer cumulative evidence—indicate that while adaptation is the great central process of organic evolution, a vast number of characters presented by animals and plants are apparently useless to the organism, at least so far as affecting the important consideration of advantage in the struggle for existence. Many of these are what are known as species characters. A thorough study of such characters makes it evident—as has been apparent for many years to systematists whose attention had been directed to this point—that the origin of species is not a primary problem of evolution. While some categories of species may be distinguished by adaptive characters most of them are not, and these latter are probably to be correctly regarded as by-products of evolution, which are produced along with adaptive characters, but are not themselves characterized by the latter. With their appear-

ance natural selection has had little or nothing to do, except in so far as non-adaptive may be correlated with or linked to adaptive characters.

A comparison of the numerous theories that have been proposed to explain the known facts of organic evolution seems to justify the statement that however they may differ in other respects, all agree in recognizing two primary and indispensable factors, without which there can be no evolution. These are termed variation and heredity. In this sense variation is the radical, progressive principle and heredity the stable, conservative principle of organic evolution. Through variation the organism constantly tends to stray from the beaten path traversed by its ancestors. Through heredity the race is held to the ancestral highway. But heredity and variation are in no sense antagonistic. They are but two aspects of one larger question.

In these days we hear a very great deal about heredity. It touches the most vital human interests at many points, and the most striking discoveries in biology of the last ten years or so have been within this field. Unfortunately, no part of biology is more misunderstood popularly than this very one. Outside of initiated circles heredity is usually pictured as something concrete—as the transmission of definite characters from parent to offspring or from more remote ancestors to descendants. The idea seems to be that there is a fundamental resemblance between heredity and the inheritance of property, and our literature and folklore are rich in aphorisms expressive of this belief. But nothing can be wider of the truth.

Heredity is not merely the inheritance of likeness. It does not mean the handing down of definite characters from father to son. Heredity means genetic continuity and the results which depend upon this fact. Nothing is handed down from parent to offspring but the minute, relatively unformed germ cells with their potentiality to develop under certain definite and limited conditions into an organism more or less closely resembling the parents. Just how this biological view of the

nature of heredity compares with the widely held popular view may perhaps be made most clear by a return to our rough analogy with phenomena of inorganic chemistry. Take the very simple case of a common substance like water. As we usually think of it, water is a liquid possessing certain well-known properties. Suppose, now, that in an appropriate apparatus an electric current be passed through a quantity of water. Bubbles of gas will be observed to arise from each electrode. These may be collected in vessels and studied separately. As you all well know, the gases are hydrogen and oxygen, and chemists have proved that under such circumstances a portion of the water has ceased to exist as such, and has been broken up into its two constituent elements. Dissociated hydrogen and oxygen may be again recombined by burning the hydrogen in presence of the oxygen, and the resulting compound may present precisely the qualities and properties of the water with which the experiment began; that is, it may be liquid, etc. But this will be true only if certain external conditions be maintained, for example, the temperature of the vessel in which the recombination has taken place must have a temperature below 212° F. If above that temperature the compound will remain gaseous and invisible. If cooled below 32° F. the liquid undergoes a profound change. It becomes a solid, which may be ice, snow or hail, according to the conditions under which the solidification takes place. Let us apply to the phenomena just described a biological terminology suited to its simplicity.

The original portion of water is a random sample representing a species. It presents numerous characters, some of which seem to be necessary to the maintenance of its existence as liquid water; that is, to adapt it to the actual conditions or environment in which it exists; others like its lack of color, taste and odor, its solvent action, etc., are non-adaptive, but serve to distinguish it from related species, such as hydrogen peroxide and hydrochloric acid. Under certain conditions part of it ceases to exist as water, loses its individuality, passes

into a simpler germinal state, in which it is resolved into its factors. The factors, which chemists term the atoms of hydrogen and oxygen, may again, under appropriate conditions of the environment, reproduce water resembling the original sample in all essential characters, but perhaps varying from it slightly in certain impurities which may have been taken into solution. Now, I imagine that chemists would consider it highly absurd were anyone to speak of the characters or properties of the sample of synthetic water as having been inherited from the original or decomposed sample, or of the latter as transmitting its characters to the former. What has really occurred is that there has been a continuity of matter between the two samples. The atoms of hydrogen and oxygen which formed the first sample have been passed on to form the second sample. They may be considered as the internal factors of the thing itself. In themselves they do not present the characteristics of liquid water, nor do they represent these characteristics. It is only when the internal factors are combined with appropriate external factors or conditions of the physical environment that the factorial combination H_2O presents to our senses that complex of properties or characters which we recognize as liquid water. Take away either of the internal factors and the essence of the thing is utterly changed. Modify any of the external factors and the combination H_2O may present a totally different set of characters. It may be solid or gaseous or exhibit many minor modifications.

So in living things no characters as such or as representative particles can be considered as passing from parent to offspring. What we believe is that the germ cells bear something in the nature of internal factors which, when combined with environmental factors, produce organisms presenting a congeries of characters more or less like those of their progenitors. Two organisms which are exactly alike—as identical twins—may supposedly be due to factors identical in every respect. If they differ ever so slightly, we may assume that there is somewhere in their factorial composition, either internal or external, a

corresponding difference. But except in a few cases, nobody has the slightest inkling of how or why these factors, either singly or in combination, produce definite characters. It will be seen, therefore, that both likeness and difference in organisms are to be explained by the same mechanism. Both are the expression of an interplay between internal and external factors. Heredity in the ordinary sense of repetition of resemblances depends upon identity of internal and external factors. Variation is a measure of factorial difference either internal or external. Which, after all, is about as illuminating as to say that heredity is heredity and variation is variation.

When the significance of this point of view is fully grasped the futility of the perennially recurring discussion of the inheritance of acquired characters becomes evident. The sharp distinction between innate and acquired characters becomes largely academic, for probably all characters are both innate and acquired in the sense that they become actualities only through a proper combination of internal and external factors. When variations, or departures from the norm or average of a species appear, we may expect that a factor or factors, either internal or external, or both, has been added or lost, or that a rearrangement of factors has occurred. Here is a real live question of important bearing on the problem of evolution. Through what changes in the whole factorial complex do new characters or variations arise? This question is just beginning to be investigated from the point of view indicated.

According to the biological theory today almost universally accepted, the most important part of the germ cells is the chromosomes, assumed to be chiefly made up of germ plasm. Omitting certain qualifications it is the germ plasm that carries the internal factors of development. Germ plasm is not, however, the product of the organism in whose germ cells it resides, though it is nourished and grows at the expense of that organism. It is a specific organized substance which every organism at the beginning of its life received from its parents and the latter again from theirs, and so back indefinitely. It may be thought

of as flowing as a continuous stream through the germ cells of successive generations, a portion of it being set apart in these germ cells at the same time that another portion plays its part in the development of the body of the individual which bears the germ cells. It is not that the germ plasm produces an individual and the individual again germ plasm in alternation, but the stream of life bifurcates, as it were, at the beginning of each generation, the one branch terminating in the body of an individual, the other continuing as germ plasm for the production of future generations but remaining quiescent within the germ cells of the individual until the conditions necessary to further development into a succeeding generation of individuals and germ cells shall have been fulfilled. Just as life is known to arise only from pre-existing life, so germ plasm appears to arise only from pre-existing germ plasm. This is the idea of the continuity of the germ plasm which in this main feature is now a well-established fact. The essence then of heredity and individual development lies in the fact that each individual begins life as a small detailed portion of the line or lines of germ plasm from which its parents, grandparents and remoter ancestors arose.

Our usual thought of the child as an immediate product of the parent is, therefore, erroneous; child, parent and grandparent are alike products of the same unbroken stream of germ plasm, somewhat as the successive annual spore-bearing fronds of a fern are the product of a continuing rootstalk. If the son resembles the father it is because both arose from the same kind of material and contain the same germinal factors combined with similar external factors. The germ plasm, and not the father, is the block from which came the chips that produced both father and son, is the way Professor Walters has expressed it.

While the conception of continuity of germ plasm is probably to be considered as removed from the realm of theory to that of ascertained fact, the same cannot be said of two other ideas which were originally attached to the germ plasm theory.

These are the ideas of the isolation and of the immortality of the germ plasm. The former has been abandoned by its sponsors and as it had scarcely reached the general public need not be considered. The idea of immortality of the germ plasm has appealed deeply to the public, and in the form in which it is commonly accepted is mischievous. Immortality should be used here in a relative sense only. The germ plasm is subject to death like other living things, but in being passed on to subsequent generations it survives the individual bodies in which it successively resides. It has no continuing life apart from the body from which it comes or that into which it passes. Whenever an organism dies without producing offspring a corresponding portion of germ plasm also dies. A vast number of lines of germ plasm, representing strains, species and types has thus come to an end during the long period of organic evolution. Those lines only have survived which are associated with animals and plants now living, and any of these or all of them are liable to extinction. Furthermore, germ plasm has undergone change in the course of time.

Everybody has heard of "Mendel's Law of Heredity." It designates the ultra-fashionable and most energetically cultivated field of biology today. But Mendelism is a method of research rather than a law. The discovery and formulation of Mendel's Law was undoubtedly the greatest single step ever taken in the study of heredity. It has given to the student of heredity a method by which the germ plasm may be analyzed into its constituent factors with an approach to the facility with which the chemist analyzes compounds into elements. This is the more remarkable because the geneticist is unable to handle germ plasm directly. Nevertheless, he can dissociate and recombine factors, and within certain limits analyze and synthetize germ plasm. He deals with it only through elaborate and exact experimental breeding of plants and animals, so conducted that germ plasm factors can be separated and distributed singly or in groups or systems in the germ cells of individual animals and plants. The behavior of bodily charac-

ters in various pedigree matings is carefully studied, and the number, mode of transmission and relations of the internal factors concerned in the production of those characters inferred. In this way considerable progress in determining the factorial composition of the germ plasms of a number of animals and plants has been made. Up to the present time, however, most Mendelian experimenters have failed to sufficiently correlate external and internal factors. In fact, most of them have devoted their attention exclusively to the latter as the seat of the particular phenomena under investigation.

In its original and simplest form Mendel's Law states that the characters coming within its scope occur in antagonistic or alternative pairs, the development of one of which in an individual excludes the others. But the presence or absence of a particular character might constitute such a pair. The facts of typical cases of alternative inheritance seem sufficiently clear, but the current theoretical explanations are less so. They all concern the architecture or constitution of the germ plasm and of the distributive mechanism of its components, which are pictured either as impossible character-representing particles or energy units or as hypothetical chemicophysical or vital factors.

In the early days of Mendelian studies the principles were limited in their application to cases of strongly contrasting characters. The whole great group of blending characters and of particulate characters were believed to be outside of the the field of their application. Later it was found that particulate characters or those which, while contrasting in appearance in the parents are distributed piecemeal or as a mosaic in the offspring, could often by the postulation of additional germinal factors be brought within the scope of the law. It was also found that some apparently alternative characters failed in certain respects to conform strictly to the Mendelian principles. The steam roller of Mendelism had been now set in motion and it could not be stopped.

More recently enthusiastic workers in this field have insisted

upon explaining blending characters and all other facts of heredity upon the sole basis of the behavior of definite discrete factors in the germ plasm. For each incompatible or refractory case an ingenious and sufficiently logical hypothesis has been at hand until Mendel's Law has become so loaded that it is little more than a restatement of the facts of heredity under a different terminology. But after all, is not this the nature of most of our advances in knowledge?

In becoming a composite made up of many elements the unit character concept seems to have kroken down, as was freely predicted years ago. The Mendelian school of experimental breeders and the Galtonian school of biometricians are being led to an alliance upon middle ground by the force of circumstances in spite of all of their efforts to remain apart and of each to overcome the other. The distinction of quantitative and qualitative in biology is not easy to define. It makes little difference in the long run whether we think of two distinguishable characters as separated by a series of steps or as connected by a particulate continuum. The distance between the two floors of a building remains the same whether we travel it by the stairway or the elevator. The characteristics of water in its three physical states are very different, but the external factor of temperature chiefly correlated with the change from one to another is continuously graded in spite of the fact that we measure it by arbitrary units. As a former teacher of physics of mine was fond of saying, it is not the last straw that breaks the camel's back, but the last straw plus all the other straws. We are also reminded of some of the fictions of mathematics. Parallel lines remain exactly the same whether we regard them as forever extended the same distance apart or as meeting and becoming continuous at infinity.

You will ask, What has all this to do with organic evolution? The new knowledge of heredity that has been gained by Mendelian studies has been hailed as a great light illuminating one of the dark spots of evolutionary theory. Because characters appear to behave as discrete units in heredity it has been

assumed that those variations only that originate in discontinuous series or by jumps can have any significance in evolution. Characters which occur in such minute gradations as to appear continuous are considered to have no evolutionary significance because they are not heritable.

As a matter of fact, paleontology seems to teach that structures of the highest evolutionary importance have originated and developed continuously by minute increments—as a blade of grass grows—and Professor Osborn has shown that certain characters so originating behave in heredity like the antagonistic characters of Mendelian terminology. It would seem, therefore, that the fact that characters behave discontinuously in heredity is insufficient reason for believing that they may not have arisen continuously under the cumulative action of continuous forces. Furthermore, as was pointed out before, the distinction between continuous and discontinuous variations has been largely bridged by the work of Mendelians themselves.

The various combinations of characters resulting from Mendelian experimentation are often referred to as though they were totally new creations. This is characterized as evolution by hybridization. It is essentially an artificial process and there is but meager evidence that it occurs more than rarely in nature. Among animals it is best known in the insects and birds. It is, of course, perfectly proper to speak of the combinations as new and to refer to them as species. This would be in harmony with our present composite conception of species. Mendelian species are to be compared with only one of the categories of species known in nature. Systematists are familiar with several other categories which it is at least premature to assume have originated through hybridization. The question as to whether these Mendelian species are really new or but permutations of characters that already existed in the parents or more remote ancestors may be passed over as being in the present state of our knowledge purely a verbal quibble.

A more important point is one which has been already made by

others, namely: that of all the numerous characters that have been tested and found to follow the Mendelian behavior very few indeed are adaptive. The vast majority are of the seemingly useless sort that distinguish many species. While it is too soon to state a positive conclusion on this point, it now seems possible that strict Mendelian heredity may have played an important part in what has been termed speciation, but a very minor part in directing the great stream of adaptive evolution.

Closely connected with this latter aspect of Mendelism is the mutation theory of evolution which has been so widely heralded as proof against many of the objections that have been urged to the Darwinian theory of natural selection, but as this will be treated in a later lecture by a member of the University staff who will discuss it from the vantage ground of an extensive first-hand knowledge, any further mention of it here would be presumptuous.

That no mere man of straw has been set up in this discussion of Mendelism in biology, but that there must be faced the real danger of revulsion that always results from overworking a good thing, such, for example, as was experienced in the case of natural selection, will be shown if you will permit the reading of the headlines printed in a local newspaper of an issue of last August, "British Scientist Entirely Reverses Darwinian Theory. Professor Bateson Suggests that True Process of Evolution May be from Complex to Simple." Aside from the fact that these headlines illustrate two of the fallacies concerning organic evolution already dealt with, they correctly represent Professor Bateson's remarks as printed later in a scientific journal. We have, therefore, to deal with the presumably serious and considered statements of a very distinguished zoölogist and a foremost leader in Mendelian research.

What he suggested in his presidential address to the British Association for the Advancement of Science was the vast importance of Mendelian phenomena in the evolution of life, the appearance of new types through the activating of internal factors after the loss of inhibiting factors previously associated

with them in the germ plasm, and the diversification of types through the segregation of factors. Thus he would account for all or most evolution through association of elements in the germ plasm. The original germ plasm (just at what point in evolution history this was introduced is not clear) contained potentially (in a very special sense) all of the factors from which the characters of all succeeding types were compounded. This is going far beyond even the most extreme Neo-Darwinian in its performationist tendencies and is a reversal indeed of our ideas of the modus operandi of organic evolution. It is employing the word evolution in the old sense of the embryologists of the seventeenth century as meaning literally an unfolding or a becoming visible of something already present and substantially preformed or represented but invisible in the germ. It abandons the idea of epigenesis or the building up by the addition of new elements to those already present, which is a fundamental concept of modern embryology and organic evolution. Furthermore, it seemingly fails to take account of all the external factors and forces which we have maintained are contributory to the production of characters and which have played their part through all of the millions of years during which animal and plant life has been evolving to its present state.

Probably Professor Bateson did not mean all that his words implied and which has been attached to them in the widespread discussion that has followed the publication of his address. In these days when the interest in heredity and organic evolution has passed from the study, laboratory and cloister to the hearth and legislatve hall, it is particularly important that safe and conservative public utterances within the limits set by ascertained truth should rule.

Summing up, we conclude that while biologists are seldom dogmatic in their acceptance of evolution, the doctrine is in no danger of being abandoned; that while much is known of its results, little is shown of its working; that it is not reduced to law; that evolution primarily implies not progress but adaptation; that the main current of organic evolution is

accompanied by minor currents producing by-products, such as species, social systems, etc., which seem to conform to many of the same general principles, but which do not profoundly influence the main current. Concerning some of the included phenomena of evolution, heredity is not inheritance of similar traits, but genetic continuity, and the dispersal of qualities in alternative inheritance is apparently not important in adaptive evolution; germ plasm is not immortal in the religious and spiritual sense; and natural selection is limited in its application, if only because a great many characters of living beings are non-adaptive.

Doubtless most of you will find this conclusion unsatisfactory, and no less so does your lecturer, but he believes that so far as it goes this lecture fairly represents the general state of certain aspects of the problem of organic evolution today. The remarkable output of experimental biological work of the last two decades has, on the whole, been negative and destructive, but by no means has it been in vain. If for a moment we recall the little wooden man introduced at the beginning of this lecture we may say that, while, on the whole, he has stood still, his arms have been most amazingly active in disposing of an accumulated mass of more or less worthless speculative rubbish. The most important positive accomplishment has been to clear the ground preparatory to the laying of foundations for the noble edifice (call it temple or laboratory, as you will) of the new evolution. The skilled artisans are already at work fashioning some of the material. Only the architect with the plans is awaited. Or to put it in another and less figurative way, we may say that biology is just about passing from the alchemy to the chemistry stage of its development. Perhaps the beginnings of our atomic theory are already in sight.

"DR. JEKYLL AND MR. HYDE" AND "THE CASE OF BECKY," AS STAGED BY MR. DAVID BELASCO, TOGETHER WITH ACTUAL INSTANCES OF DUAL PERSONALITIES

By Edward Tyson Reichert

Professor of Physiology, University of Pennsylvania

The noted English author, Mr. H. G. Wells, was asked, "What is the first step toward literary production?" and he is accredited with the reply: "It is imperative, if you wish to write with any power or freshness at all, that you must utterly ruin your digestion." Perhaps in such a light the originality of the stories of "Dr. Jekyll and Mr. Hyde" and "The Case of Becky" may suggest to some of you the outpourings of abnormal minds, but we find in the histories of the lives of some who have lived before or with us abundant inspiration for such fiction, and a reminder of the well-worn words of Byron:

'Tis strange, but true; for truth is always strange—stranger than fiction.

When we speak of an individual's personality we have reference to the sum or totality of his mental traits, which traits are expressions of correlations of the past with the present, and not only of his individual past, but also of the lives of ancestral generations which have left their impress on his mental processes. Personality is a manifestation of an extremely complex aggregate of interassociated and interacting mental states—a combination that is so plastic that one or more of the components may become suppressed or exaggerated, and thus transiently or permanently impart to the individual mental characters that are more or less at variance with his recognized identity.

All of us are familiar with the alterations of personality that are associated with different periods of one's life, as instanced

by Shakespeare in the Seven Ages: "At first the infant, mewling and puking in the nurse's arms. And then the whining school boy. . . . And then the lover . . . with a woeful ballad. . . . Then a soldier full of strange oaths. . . . And then the justice . . . full of wise saws. . . . The sixth age shifts into the lean and slippered pantaloon. . . . Last scene of all that ends this strange eventful history is second childishness." All are aware of the transitional character of our personalities in our everyday lives, as is expressed especially by our variable moods; by the duplicity of personality of the habitual one-day saint and six-day sinner; by the ease with which the actor assumes different personalities, associating with each such traits as characterize the subject; and by the changes brought about by intoxicants—the quiet, kind, loving, moral, cultured man becoming quarrelsome, brutal, lewd, profane and utterly lacking in the high ideals that characterize his normal life. We know too that in somnambulism, delirium and certain hysterical states the individual may exhibit mental traits which in many respects are markedly or wholly different from those which typify his normal life; that hasheesh and certain other drugs may produce in the subject a delusion of an existence of a double personality, that is, a sense of having two mental lives which may hold communication; that in certain forms of insanity the individual has the belief of a dual mental and physical existence, even becoming obsessed with the delusion that he is not himself but his double; and that the mental life of normal, hypnotic and narcotic sleep is usually quite different from that of the waking state. But none of these instances is to be included in the category of dual personality, because in each there is merely a single personality that has become modified in normal or abnormal ways, whereas in cases of dual personality there are two mental individuals belonging to one body, both sane, each having self-consciousness and each having its own characteristic mental life.

There can be no question of a close relationship between the psychic states of somnambulism, hysteria, delirium and insanity

with those of dual personalities, and it may not always be possible to definitely differentiate them. Where insanity begins and sanity ends no one knows. Who can tell whether or not certain people are sane or insane? Similarly, where modifications of a single personality end and dual personalities begin no one can say, yet in both instances there are well-defined types that are so definitely characteristic that we can declare positively that there is one or the other. It is such types that must be studied at the outstart if we are to have clear conceptions of class distinctions and understand the psychology of these extraordinarily interesting cases of two different minds belonging to one body.

Typical cases of dual personality are characterized by the existence of two distinct, sane, self-conscious mental lives belonging to one body. The change from one personality to another is usually abrupt, without obvious cause, and commonly following a period of loss of consciousness, usually sleep, which commonly is long and profound. Upon the return of consciousness there exists a partial or complete loss of memory of the knowledge that particularized the individual's life, this loss being associated with a change of character, so that the subject is to all intent and purposes another mental individual, having a different memory, will, disposition, intellectual powers and habits of mind and body. The acquired personality or secondary state may have no recognition of the existence of the primary or normal state, or *vice versa;* its mental and physical lives may be so entirely different from those of normal life that if reversion occurs to the primary state his secondary state may, as it were, be completely blotted out, so that mental existence is resumed where it ceased when the secondary state appeared, the subject having no knowledge of his life in the interim. In some instances there occurs repeated alternation of the two personalities, and in such cases one personality may at once, or in the course of time, recognize the existence of the other, the subject becoming conscious of a dual mental existence, eventually blending the two, or adopting one or the other

permanently, and not infrequently the secondary or supposed secondary state. Sometimes there appear multiple personalities, that is, as many as ten or more personalities may be developed, one succeeding another, each differing from the others, each being as characteristic as though the individual had been as many times reborn. And so one might go on indexing these varied and uncanny manifestations of mental life which seem more like freaks and monstrosities of the imagination than actualities of life. Perhaps as many as forty cases of dual and multiple personality have been reported, some of which have been republished time and again; yet they are almost unknown even to the medical profession. Undoubtedly a very large number have existed, and many of the unfortunate subjects found lodgment in insane asylums and prisons.

Turning our attention now for a few minutes to fiction, and first to Robert Louis Stevenson's story of Dr. Jekyll and Mr. Hyde, Dr. Jekyll is described as a large, well-made, smooth and handsome-faced man of fifty, with perhaps something of a slyish cast, but with every mark of capacity and kindness, and who cherished sincere and warm affections. He was a connoisseur, inclined by nature to industry, and fond of the respect of the wise and good. The worst of his faults was a certain impatient gayety of disposition, such as has made the happiness of many, but such as he could not reconcile with his imperious desire to carry his head high and wear a more than commonly grave countenance before the public. Hence, while he indulged he concealed his pleasures, hiding them with an almost morbid sense of shame, and standing committed to a profound duplicity of life, he saw that two natures contended in the field of consciousness and conceived of the separation of these natures by taking a drug, and of recombining them by an antidote.

Upon taking the potion, agonies were caused which swiftly subsided, and as if out of a great sickness he came to himself in the form of Mr. Hyde, a man tenfold more wicked than his primary self and sold a slave to his original evil. As Mr. Hyde he was dwarfish and gave the impression of deformity without

namable malformation. He had a displeasing smile and bore himself with a sort of murderous mixture of timidity and boldness. He spoke in a husky, whispering and somewhat broken voice, and his manner aroused disgust, loathing and fear. He seemed hardly human and was inherently malign and malicious, taking pleasure in the infliction of every degree of torture. He had the name of Satan written on his face. Mr. Hyde drinking the antidote, cried, reeled, staggered, clutched at the table, staring with injected eyes and gasping with open mouth, pale and shaken, and half fainting, was transformed to Dr. Jekyll. The two natures had memory in common, but all other faculties were most unequally shared between them.

Transitions from one state to the other were frequent, and in time Dr. Jekyll, like those of us in everyday life who habitually give way to evil inclinations, lost hold, as it were, of his original and better self, and became slowly incorporated with his secondary or worse self in the form of Mr. Hyde. He soon came to a realization that he had to choose between the two, and choosing the better, he for two months was Dr. Jekyll. Then, in an hour of moral weakness, he again swallowed the transforming potion, and instantly the spirit of hell awoke and raged in him, and again was he the moral monster, Mr. Hyde.

Characters of the types of Dr. Jekyll and Mr. Hyde are common in literature and to the playgoer, but the conceptions of the existence of two characters in one person that are separable and reassociable by drugs, and the transformation of one personality into another in sight of an audience, are exceptional, yet by no means visionary. In the staging of the play the interest naturally centers in the transformation in sight of the audience of two mental and physical beings who are so unlike. Mr. Mansfield had no difficulty with the aid of stage accessories of making this change very realistic and wholly convincing. Dr. Jekyll appears before the audience as a stately, refined man. He drinks the transforming potion, immediately the lights become dim, his back is turned toward the audience, he dishevels his hair, blackens a tooth, assumes a crouching

attitude, with clawlike and knotty fingers and a demoniacal expression, and now turns to the audience to be seen in the glow of green light which envelops all in a most gruesome atmosphere, imparting a ghastly pallor to a hideous face.

"The Case of Becky," while presenting certain features in common with those of Dr. Jekyll and Mr. Hyde, is in its manifestations of the secondary state and in certain other respects quite different. The story of Dr. Jekyll and Mr. Hyde belongs rather to the category of drug fiends we read of from time to time in the daily press; but "The Case of Becky" is one of dual personality, and the conceptions of the author are well founded in histories of cases in life which are even more weird and interesting, and seemingly improbable.

In normal life the person of Becky was known as Dorothy. Dorothy, it will be recalled, was the stepdaughter of an unscrupulous, itinerant hypnotist. She was made by him a hypnotic subject, and grew up amid surroundings such as would naturally tend to develop in a very sensitive girl abnormal mental states. She in time fled in terror from her degenerate and conscienceless stepfather, to be found after some years in a sanitarium, where we are made familiar with her dual lives. As Dorothy, she was a highly sensitive, charming and lovable young woman; sweet tempered, fond of reading, and with exemplary habits of mind and body. At times upon awaking from a short sleep she would exhibit a personality which was the very antithesis of the normal. In this state she was known as Becky. She was quarrelsome, disagreeable, used coarse language, was profane, tore her clothing and took great delight in annoying those about her, and played all sorts of disagreeable tricks upon her primary self, which appeared to her as the person of another individual, hiding and destroying things which she imagined belonged to this hated person.

Mr. Belasco, in the staging of "The Case of Becky," showed remarkable skill. Dorothy was a very impressionable girl who, because of abusive treatment and repeated subjection to hypnosis by her stepfather, had her mind so peculiarly

affected as to become a victim of self-hypnosis and to lead to the development of a second personality entirely different from her normal. After the appearance of the second personality an alternation of the primary and secondary states took place for years, until finally, under the care of an expert neurologist, she was through hypnosis restored to her normal self. Such cause, effect and cure are wholly in accord with the facts of science, although perhaps exceedingly few of the audience, and very few critics, looked upon them as being otherwise than entirely imaginative.

What seemed to be the most vulnerable feature of the presentation was Dorothy's consciousness of the presence of her stepfather in some way other than by her ordinary senses—in some occult manner, such as by telepathy, that is, by an influence of one mind over another at a distance by other than the normal channels of communication. But this very point, seemingly small and unimportant to the lay mind, was not overlooked by so skilful a stage craftsman. Those who followed the play with discernment will recall that at a moment before Dorothy appeared on the stage in a self-hypnotic state her stepfather, who was unseen at the time, had coughed loudly and in a strikingly peculiar way—a cough which we are supposed to understand was heard throughout the sanitarium. It was this cough which was intimately related to the horrors of her girlhood, though not consciously recognized by Dorothy, that so affected her peculiarly sensitive and abnormal mind as to throw her into hypnosis. In this condition she was *en rapport* with her stepfather, extremely sensitive to his presence, and almost wholly submissive to his will. Even in the hypnotic state she had some consciousness of her well-nigh helplessness and the perils that encompassed her in the presence of her stepfather. To dissipate the tendency to self-hypnosis and prevent the recurrence of the secondary state by hypnotic suggestion, in accordance with the play, may seem to be visionary, yet it is entirely consistent with the facts of science. The presentation of the dual character was remarkably true to life.

Turning now from fiction to strange stories from life, we find that the essential features of "The Case of Becky" have their counterpart in the history of the case of Miss Beauchamp, which was published by Dr. Morton Prince ("The Dissociation of Personality," 1905). The subject was a person in whom three personalities spontaneously developed, each being distinctly different from the others in trains of thought, views, ideals, temperament, acquisitions, tastes, habits, experiences and memories. Only one of the three had any inherent knowledge of the others, and the other two had no knowledge of each other or of the first except such as had in time been obtained by inference or by information from other people. Suddenly we find one personality vanishes and another appears in kaleidoscopic succession, each being ignorant of what was said or done or where she was while in the immediately preceding personality. For six years these three personalities played a remarkable and almost unbelievable comedy of errors, making their entrances and exits in a most inexplicable way, each for a time playing her part, each being as individualized mentally and physically as though there were three persons having quite different personalities.

Miss Beauchamp is described as having been a nervous, impressionable child, given to day-dreaming, living in her imagination, unduly influenced by her imagination, living in a land of idealism, and seeing people not as they are but as she imagined them to be, and lacking in true conceptions of her environments. She was intellectually keen and fond of books, and she idolized her mother, who, however, was devoid of affection for her, the effect of which was to make her morbidly reticent and live within herself and her imagination. When eighteen years of age a nervous shock played the principal rôle in the development of the remarkable personalities that for some years encompassed her life. At twenty-three she was a college student, ambitious, over-conscientious, mentally and morally stubborn, very nervous, a neurasthenic of an extreme

type, and a continual sufferer mentally and physically, becoming worse and ultimately unfitted for work.

In the course of time two personalities developed which came to be distinguished as Sally, and the Idiot. The three personalities (Miss Beauchamp, Sally, and the Idiot) were so different as to suggest the designations The Saint, The Woman, and The Devil. The Saint, Dr. Prince states, the typical saint of literature, is Miss Beauchamp, and her character may fairly be said without exaggeration to personify those traits which expounders of various religions—whether Christian, Buddhist, Shinto or Confucian—have held up as ideals to be attained by human nature. The Idiot he describes as the personification of the frailties of temper, self-concentration, ambition and self-interest, which ordinarily are the dominating factors of the average human being, her ideals of life being to accomplish her own ends regardless of the consequences to others and of the means employed. Sally, the Devil, was not of the moral monster type instanced in Mr. Hyde, but a mischievous imp who would take pleasure in thwarting the ambitions or aspirations of humanity.

Inasmuch as Miss Beauchamp was a physical wreck, it might naturally be assumed that her bodily ailments would be carried into her other states, so that notwithstanding great changes in mental traits her bodily traits would continue the same. But this did not occur, thus showing in an extraordinarily impressive way the potent influences of the mind over the body. While Miss Beauchamp was always ill, always suffering, always physically weak and incapable of more than very little physical and mental exertion, the Idiot showed a markedly lessened neurasthenia and was capable of physical and mental exertion much beyond the powers of Miss Beauchamp, yet with distinctly less capacity than Sally. As Sally, the Devil, she was a stranger to illness and had remarkable physical endurance, knowing neither fatigue nor pain. While in the state of Sally she would take long walks, far beyond the physical strength of Miss Beauchamp, and then suddenly Sally would vanish and the

body be returned to Miss Beauchamp, who would come to herself in a state of utter exhaustion, notwithstanding that only a few moments before, as Sally, there was physical vigor.

Miss Beauchamp and the Devil in their physiological and moral tastes, moral characteristics and acquisitions were almost wholly antipodal. The kinds of food and drink liked by one were disliked by the other. Miss Beauchamp's appetite was poor, she cared little for the pleasures of the table, never used vinegar or oil, and was very fond of ice cream and broths, etc. The Devil had a good appetite, enjoyed the table, used freely vinegar and oil, never ate ice cream or broths, etc. Miss Beauchamp wore her hair low and her clothing loose, and was fond of church and devotional books. The Devil wore her hair high and her clothing tight, and never voluntarily entered church or read devotional books. Miss Beauchamp was patient, considerate of others, amiable, hated sewing and was very fond of children. The Devil was most impatient, most inconsiderate, unamiable, given to rages of violent temper, liked sewing and looked upon children as a great nuisance. Acquisitions of Miss Beauchamp were often not possessed by the Devil, and those of the latter not often by Miss Beauchamp. And so in very many ways one personality was the antithesis of the other.

Sally is described as having a character, trains of thought, memories, perceptions, acquisitions and mental traits generally which were quite different from those of Miss Beauchamp. Sally claims that she knows what Miss Beauchamp thinks, says, writes and does, sees what she sees at the time and not as knowledge afterwards acquired. Curiously enough, while Miss Beauchamp could hide absolutely nothing from Sally, she was absolutely without knowledge of the existence of Sally; and Sally, while recognizing the existence, thoughts and so on of Miss Beauchamp, did not associate Miss Beauchamp with herself or her body, but imagined her to be another individual. Sally had a jealous hatred of Miss Beauchamp, and remarkable and almost incredible were the pranks, torments and terror to which Miss Beauchamp was subjected. The personalities

of Miss Beauchamp and Sally frequently alternated. A favorite form of Sally's amusement was to suddenly vanish and restore the body of Miss Beauchamp under conditions that would give rise to great mental and physical suffering. Sally would write most annoying letters to Miss Beauchamp, and she had a most subtle way of stating just enough to cause Miss Beauchamp's imagination to run riot and to fancy all sorts of things, and generally to create a state of mind full of apprehension or even terror. Sally would make engagements which she knew Miss Beauchamp could not keep, and often Miss Beauchamp would awake to find that she had unknowingly done something entirely different from that which she had contemplated. Miss Beauchamp's promises were broken and engagements were made which were objectionable or even of such a character as she could not in honor keep. Sally would write letters exposing the private affairs of Miss Beauchamp, and by distorting, exaggerating and deliberately lying she caused the keenest sense of mortification and increased the illness of Miss Beauchamp by the intense anxiety.

Sally took advantage of Miss Beauchamp's carelessness about the care of money, and many were the torments to which the latter was subjected. One day Miss Beauchamp was sorely worried over the mysterious disappearance of some money. Sally had hidden it and written a note to Miss Beauchamp, which was received a day later, telling Miss Beauchamp that she was too negligent and incapable of taking proper care of money, and that she would accordingly be put on an allowance of ten cents a day with which to amuse herself. For some time thereafter Sally doled out sums of two, five or ten cents, and then would vanish, giving back the body to Miss Beauchamp.

One of Sally's most annoying pranks was in an unraveling of knitting that had been done by Miss Beauchamp. The latter had worked for months on a baby's blanket, and when near completion she found it unraveled. Beginning her task again, and nearing completion, she would again find it pulled apart. Finally, when at last the blanket was done, Miss Beauchamp

vanished and Sally appeared. Sally pulled the whole of it to pieces, and as she drew out the yarn wound it about the furniture, carried it from picture to picture, and then back to the different pieces of furniture, finally hiding the ends somewhere in the bed. Then Sally, standing in the midst of this perfect tangle of threads, awakened Miss Beauchamp, who came to herself in this maze, the tangle of which was so great as to necessitate the cutting of the yarn to get it out.

Sally, it will be remembered, had remarkable physical endurance and was never known to suffer from fatigue, and, as might be inferred, loved outdoor sports, amusements, games and other diversions that involve much physical activity. Miss Beauchamp, to the contrary, was physically so weak and utterly lacking in physical endurance that her life was of necessity of a very sedentary character. Sally, knowing these facts, took great delight in long walks, which, while exhilarating to her, were most harrowing in their consequences to Miss Beauchamp. Once Sally took a car to a suburban town from which she took a walk for a distance far beyond the physical powers of Miss Beauchamp. Then she deserted the body of Miss Beauchamp, the latter awaking to find herself in an unknown place, ignorant of her way home, weary, helpless and exhausted. After some of these experiences Miss Beauchamp was so exhausted as to be confined to bed for days.

Sally, hating Miss Beauchamp and being aware of her antipathies, subjected Miss Beauchamp to varied experiences. Among these antipathies was an abhorrence of spiders, snakes and toads, contact with which threw her into a state of terror. One day Sally placed a neatly tied box in Miss Beauchamp's room, and Miss Beauchamp, upon opening it, screamed in terror when six spiders made their exit.

For two years this extraordinary and almost incredible play of comedy, farce and drama of different personalities in one body went on in bewildering alternation.

Miss Beauchamp was repeatedly hypnotized by Dr. Prince, and in the course of time there developed a half-hypnotic state

in which there occurred a personality different from the other three. She in this state had a full knowledge of the events of the past six years. She now seemed to be without the morbid idealism and impressionability so strongly marked in the personality of Miss Beauchamp, and was also without the melancholy sadness and weariness, and was less nervous and humble. She was light-hearted, natural and physically strong, and possessed greater spontaneity and intellectual grasp. This personality appeared to be the fused personalities of Miss Beauchamp and the Devil, a personality that had lost the morbid emotional idealism of the former and the impishness, temper and wilfulness of the latter.

Naturally, the question arises as to which, if any, of these personalities is to be regarded as the real Miss Beauchamp. Dr. Prince answered this question by showing that the real Miss Beauchamp is not the Miss Beauchamp we met at the beginning of our recital, but the fused personalities of Miss Beauchamp and the Idiot he brought about and rendered permanent by hypnosis. The personality of Miss Beauchamp as we first knew her, was, like the personalities of Sally and the Idiot, a dissociated or detached mental state, the other mental states being for the time latent or submerged. What became of Sally? The mental state represented by Sally seems to have been a subconscious state that became dominant because of the splitting of the primary self into two parts, one part becoming suppressed. The union of the personalities of Miss Beauchamp and the Idiot gave rise to a personality of such potentiality that the personality represented by Sally was submerged in subconsciousness. The personality of the real Miss Beauchamp after a period of vacillation had continuous existence, and Miss Beauchamp was thereafter a mentally and physically strong individual.

In the case of Miss Beauchamp, it will be recalled that while Sally had full knowledge of Miss Beauchamp and the Idiot, the Idiot had only a scrappy knowledge of Miss Beauchamp and no knowledge of Sally, and that Miss Beauchamp had no knowledge whatsoever of the existence of either Sally or the Idiot. In

the case about to be referred to, the secondary personality, unlike Sally, had no knowledge of the primary state, nor had the primary state any knowledge of the secondary. The secondary personality, curiously enough, played pranks similar to those of Sally, but not upon her own person.

The history of Mary Reynolds was reported by Dr. S. Weir Mitchell to the College of Physicians of this city in 1888. The subject was a very impressionable girl. A nervous shock resulted in the development of multiple personalities which existed over a period of years, her normal personality, as in the cases of the fictitious Dorothy and the real Miss Beauchamp, being restored by hypnosis.

Miss Reynolds' family moved from England to the wilds of western Pennsylvania during the early part of the eighteenth century She is said to have possessed an excellent mental capacity and to have enjoyed fair opportunities to acquire knowledge. Besides the domestic arts and social attainments, she had improved her mind by reading and conversation. Her memory was capacious and well stocked with ideas. She was sedate and reserved, and tended to melancholy. When eighteen years of age she had hysterical fits, and after one of these attacks was blind and deaf for six weeks. About three months later, after having almost wholly recovered her normal health, she fell into a profound sleep, which lasted about twenty hours, upon awaking from which memory had completely fled, and she was to all intents and purposes a being for the first time ushered into the world. Her parents, brothers, sisters and friends were not recognized; the scenes to which she was accustomed—the house, hills, fields, forest, vales and streams—were new. She began to learn, but always when in this new personality she looked upon those she had once known as strangers and enemies, among whom she was by some remarkable and unaccountable means transplanted, though from where she had not the remotest idea. She learned to read and write, but her handwriting was not the same as that of her primary state.

Instead of being melancholy, she was cheerful to extremity,

buoyant and sociable. Formerly taciturn and retiring, she was now merry and jocose, extravagantly fond of company and enamored of nature. She had no knowledge and, consequently, no fear of wild animals. Upon one occasion she referred to a bear as a great black hog, saying that as she was riding along a narrow path a great black hog came out of the woods and stopped her; that she had never seen so impudent a hog before; that it stood on its hind feet and grinned and gnashed its teeth; that she tried to make her horse go on, but without success; and, finally, that she told the hog to get out of her way, but not doing so, she said, "Well, if you won't go for words, I'll try blows," and getting off her horse, took a stick, and walked toward the animal; it got down on all fours and slowly walked away, grinning and growling.

Six weeks after the appearance of her second personality she fell into a protracted sleep, from which she awoke in her primary state, recognizing the members of her family, remembering what she had planned as though but yesterday. She was absolutely without memory of the events or existence of her second personality, and was greatly surprised at the change that occurred in her nature overnight.

Remaining in her primary state for a few weeks, she again fell into a sleep from which she awoke in her secondary personality, now beginning life where she had left it weeks ago when she re-entered the life of her primary self, having now only the knowledge of her secondary state. Her vivacity, wit and humor were now so great as to make her company very much sought, but her love of playing tricks upon others often led to much trouble. She would, for instance, knowing that her brother had proposed a hunt for the next day, take the hunting coats miles away, neither loser nor finder being able to account for them. Again, on one stormy night in winter she put on a man's hat and cloak, called on a doctor she disliked, and left a message for him to go to a house a long distance away where, as she stated, a man lay severely injured. The doctor responded to the call, only to find that all of the family were asleep and well.

Alternations in personality went on for fifteen or sixteen years, the secondary personality tending to remain for increasingly longer periods, when she assumed the second personality, continually existing in this state for the remaining twenty-five years of her life without the least knowledge of her other self beyond what had been told her.

Another case, in some respects similar to that of Miss Reynolds, and known as Félida X, was studied by Dr. Azam, and has become world-renowned. Félida came under Dr. Azam's observation when fifteen years of age. She had had many hysterical and other troubles, which led to her becoming a timid, serious, grave and melancholy individual who was burdened with anxiety and pain. Appearing to faint away for a few moments, she would awake, having an entirely different personality. Her pain, anxiety and other mental and physical infirmities had vanished, and she was gay, vivacious and coquettish and morally perverted. She remembered the incidents of her normal life, as did Sally of the life of Miss Beauchamp, but when in her primary state, like Miss Beauchamp and Miss Reynolds, she had no knowledge of her secondary state. These personalities alternated with great frequency, but the primary state lasted for shorter and shorter periods, and was ultimately crowded out, as it were, by the secondary state, as in the case of Miss Reynolds, which thereafter constituted her constant personality.

It is probable that in the cases of Miss Reynolds and Félida the personality which at first was recognized as the secondary personality was in reality the primary personality or normal state, and hence that the personality that was ultimately established was in reality not the secondary, but the primary.

In these cases of dual personality the nature of the change in the individual's moral character may differ very widely. We have seen in the instance of Dr. Jekyll and Mr. Hyde a form of moral monstrosity that is manifested in an inherent maliciousness and a demoniacal pleasure in the infliction of torture on others—a form of immorality that arouses hate, fear and loathing. In the cases of Becky, Sally, Mary Reynolds and

Félida, there were forms of moral perversion that led to the annoyance of themselves or others, or of such a kind as to engender sympathy. The most pathetic among these instances of marked moral alienation was that of a young woman, recently a patient in this city, who in her natural state was the personification of all that is attractive, lovely and sublime in young womanhood, and who at times upon awaking from a deep sleep would have an entirely different personality, with manifestations of moral monstrosity that vied in vileness with those of the denizens of the tenderloin.

In many cases the secondary personality appears but once, and sooner or later gives place to the normal. An interesting instance belonging to this category was reported by Dr. Osborne. The subject was a man of middle age, in admirable health, very fond of his family, and not known to have any eccentricities, morbid tendencies or bad habits. For years he had resided in a town near this city, and by strict application to his business, which was that of a tinsmith and plumber, had been successful and accumulated some means. One dull and gloomy Sunday in November he mysteriously disappeared. He had remained in the house, mainly engaged in reading and playing with his younger children, until four o'clock. Arising from a couch upon which he had been reclining and reading, he said that he was going out for a short walk and a little fresh air. Leisurely, quietly and apparently perfectly normal, he stepped outside of the door to disappear as mysteriously as though the earth had swallowed him. Not one of the many people on the thoroughfares saw him, or at least remembered him. He left not a single trace; rewards and detectives proved unavailing. It was found that he had not taken any money with him except what he might usually have carried on his person. After some months, all hope of ever seeing him again having been abandoned, his business affairs were closed and his wife and family, who had been well provided for, moved to Chicago.

Two years later in a tin shop in one of the southern towns where a number of men were engaged at work, one of the men

suddenly dropped his work, and, pressing his hands to his head in a dazed way, exclaimed: "My God, where am I? How did I come here? This is not my shop. What does it mean?" At first the men were disposed to laugh and jest at the man who for several months had been so reserved and sober, and who had worked so quietly by their side, but of whose history they knew nothing. Seeing his changed expression, his face wet with perspiration and his nervous twitchings, and hearing his piteous appeals, they became startled and called him by a name that was strange to him, yet the one he had given them. Trembling with suppressed emotion, he made his way to the proprietor, and with some difficulty made the proprietor understand his true condition and the story of his northern home, family and prosperous business which, as it seemed to him, he had left but the afternoon before. Under the assumed name he had been known and paid, but the entire period from the time he left home until the present was a complete blank. After ascertaining the whereabouts of his family, he joined them and from last accounts was living the life of his normal self.

A variable number of different personalities may develop in a given individual, the person living as many different lives, each being partly or wholly ignorant of the existence of the others. Thus, a man by the name of Monks, a son of wealthy people who lived in London, lived four different lives, mingling in four different classes of society and having four different sets of friends. As a conscientious clerk he was quiet, retiring, deferential, cared little for the society of women, did not smoke, and was extremely exemplary in his habits. As a professional bicycle rider he was loud-voiced, boastful, swaggering, profane, a smoker and a drinker. As a society man he was a fashion plate in his attire, of graceful ease, and extremely popular with the ladies, to four of whom in different parts of London he was engaged to be married. As a burglar he was most skilful and daring, and it was only after years that shrewd detectives ran him down, and not knowing of his peculiar mental state, had him committed to prison as a common criminal.

A case of a man having six personalities was reported by Bourru and Burot. In the first personality he was talkative, violent, arrogant, rude, disrespectful, anti-religious, embarrassed in speech and with limited though precise memory. In the second personality he was reserved, gentle in speech, orderly, respectful, without religious opinion, and his speech was easy and pronunciation clear, and he had little memory of the past. In the third personality his state was very much like the second, but his memory was limited entirely to the third state. In the fourth personality he was timid, sad, well-mannered and his intelligence was obtuse, his memory confused and his language incorrect and childish. In the fifth personality his mental state reverted to the period when he was fourteen years of age. He had the timidity, language and attitude of a child, and was without memory of any of the incidents of his life subsequent to this time. In the sixth personality he was a proper young man, a soldier of the marine corps, and his memory embraced his entire life excepting the period known as his fourth state.

In a young girl as many as ten personalities were developed in twenty months, and in one of them she reversed everything—to her white was black, heat was cold, etc., and even her writing was reversed.

Among all of these remarkable cases of dual personality none is, on the whole, so interesting and so instructive as that of the Rev. Thomas C. Hanna, which was carefully studied by Drs. Sidis and Goodhart ("Multiple Personality," 1905); and no summary, however brief, would be adequate without at least some reference to this extraordinary record. The differences in the personal traits, the complete loss of memory in the secondary state, the gradual childlike acquisition of knowledge, the childlike wonderment of what was seen and heard, and the ultimate recognition of the existence of two personalities, with their separate lives and their final blending, form one of the most absorbing stories in psycho-physiological literature.

The Rev. Mr. Hanna was born in 1872 and had an exceptionally good family history and all the advantages of an excellent

education, and was a good scholar. He entered the Manual Training School of Philadelphia, and his high scholarship gained for him admission as a free student to the Architectural School of this University. During his stay with the University of Pennsylvania his sense of religious conviction became so awakened that he gave up his studies for those of theology, and in order to prepare himself for the practical duties of the ministry he took up missionary work, later becoming a student of the Baptist College at Lewisville, Pa., and subsequently entering the Theological School of Yale University, devoting considerable time during these periods to practical ministerial duties.

He had an earnest, ardent, sympathetic and impulsive nature; was well-balanced and possessed a strong will combined with perfect self-control. We find him at twenty-five years of age the pastor of a church at Plantsville, Conn.

At seven o'clock one Thursday evening, when attempting to alight from a carriage, his foot caught in a lap robe and he fell head foremost, striking his head, and when picked up a few moments later life seemed almost extinct. In this state he remained for two hours, then began to move, looked around in a bewildered way, rose from the bed and in a dazed manner attempted to push aside one of the physicians. His three attendants, believing him to be delirious, seized him and attempted to force him back to bed, but Mr. Hanna's strength, while ordinarily excellent, now seemed herculean, and his opponents were readily worsted. Finally, he was overcome and securely bound with straps, for fear of his injuring himself or others. While now having the physical strength of an exceptionally robust man, his mind was a blank, as void as though he had just been ushered into the world. He saw, smelled, tasted and touched, but these senses conveyed absolutely no meaning excepting as to mere light and darkness and color. Of objects, space and time he had no intelligent perception. There was no perspective sense, everything, irrespective of distance, appeared close to his eyes, giving him the impression of one great picture. An object seen through the window appeared as near

as his outstretched hand, and he would not have had any hesitancy in attempting to grasp the moon. Once, when he reached for a picture, he was given a looking glass. Peering into the glass and seeing an image, which he did not recognize as being that of his face, feeling the glass, which, of course, he did not recognize as such, he was amazed to find that the image did not feel like a person's face such as he had recently become familiar with. Upon turning the glass sideways he was surprised to see the face turn away, and then, looking upon the back, was astonished to find that there was not an image.

Sensations of hunger gave rise to great distress, but without arousing the least knowledge of the reason. Food placed in his mouth did not excite any sense of its use. He made no attempt to either masticate or swallow it, and in order to feed him it was necessary to force food back into the pharynx to cause reflex or involuntary swallowing movements.

Bodily movements alone at first attracted his attention, and he learned in time to distinguish between movements of his own body and those of other people and things. He gazed at moving objects with the wonderment of the young infant, and after he had learned to associate movements with life he thought all moving objects living things, the swaying of the branches of a tree appearing to him movements of living creatures, and the horse and carriage a single living object.

He heard conversation, or noises as he termed them, and in time recognized that by their means people could understand each other, and although he had not the least idea of the meaning of a single word, he thought he could learn to communicate with others by repeating the noises he had heard. Hence, he would again and again repeat in his mind these sounds, and then repeat aloud words and sentences he had committed to memory; but he was surprised to find that he was not understood, and for a time he became discouraged. Not knowing the meanings of his utterances, his speech was, of course, utterly unintelligible. It was not until the lapse of two days that he had learned the real meaning of a single word.

By this time he was able to recognize time by the difference between daylight and lamplight and by the recurrence of the three daily meals. His education may now be said to have been fairly started. He began to understand, speak, read and learn to walk. One of the greatest difficulties that beset him at this time was to make people understand what he wanted, owing to the extreme limitation of his vocabulary. He had been taught to recognize an apple, and that it is something to be eaten. Hence, whenever he was hungry, having by this time associated the sense of hunger with the need of food, he would ask for an apple. Having eaten various articles of food, he was greatly annoyed because the attendants would always bring him an apple, which he did not want, but other kinds of food, yet not knowing the word food, or dinner, or eat, etc., he could not make himself understood.

He knew not a man from a woman, but he recognized that some people were larger, had larger hands and feet, were stronger but not so gentle, and had voices that were not so soft as others; but he had no idea of sex. Babies he regarded with wonderment, and he could not form any association between childhood and adult life, believing that all people began life full-grown like himself.

Owing to his mental faculties having been highly developed, and to his inherent capacity for rapidly acquiring knowledge, he learned with amazing rapidity, even to the attainment of accomplishments that were unknown in his normal life. Thus, he learned in a few hours to play the banjo, an instrument with which he had had absolutely no experience.

For nearly two months he remained in this mentally childlike state, gradually but with extraordinary rapidity acquiring the elementary knowledge common to early childhood; having absolutely no knowledge of his existence before the accident or of his actual relations to the people about him, and developing during this period an entirely distinct personality, as different from his normal as the personalities of two people differ. His memory was so keen during and after this period that upon his

ultimate recovery he was able to give a minute account of his experiences, and thus unfold a remarkable history of incidents such as presumably are attendant upon the education of the infant and very young child.

The period of second personality lasted for seven weeks, and was ended by his falling asleep and awaking as the Rev. Mr. Hanna, he now having absolutely no remembrance of what had transpired since the moment of the accident. He thought that the accident had occurred the evening previous, and when told that it was seven weeks ago he thought the speaker jesting and the story a huge joke.

He had been in New York for some time, but he failed to recognize his surroundings, and the people who had been in constant attendance for weeks past were absolute strangers, excepting his brother, the only one he had known in his normal state. He looked about the room with curious interest, not having the least remembrance that all had been very familiar to him, or having the least recollection of a picture which the evening before he had examined.

In the midst of the conversation he suddenly exclaimed, "What a funny taste in my mouth; you must have been feeding me on tobacco." Before going to sleep he had smoked a cigarette, but not having used tobacco for many years, and not having any knowledge of the events of the previous evening, he could not in any way account for the taste. When asked how he felt, he said, "I feel just like Rip Van Winkle." After remaining in his primary state for three-quarters of an hour he fell asleep, awaking in his second personality, his mental life beginning where it had ceased upon falling to sleep the night before, he not having a vestige of knowledge of what had transpired between the two periods of sleep. When asked what he meant by "feeling like Rip Van Winkle," he replied that he had never heard of such words as Rip Van Winkle, and that he did not know their meaning. While entirely familiar with the story of Rip in his normal life, he had not known anything of it in his secondary state. Each mental life, it will be observed, remained up

to this period apparently entirely distinct from the other, each having its own memories.

From this time on there followed frequent alternations of the primary and secondary personalities, the transition from one to the other occurring without obvious cause and with increasingly greater frequency. The alternations were for a time wholly unknown to Mr. Hanna, excepting in so far as he was informed by others; and owing to the very different memories of the two states, more or less serious embarrassments were caused. For instance, once when in the secondary state, while Mr. Hanna was staying at a house in which there was a very attractive and intelligent woman, he became very cordial, and confided to her the story of his peculiar life that had been told to him by his brother. While there he passed into his primary state, and, of course, not recognizing the young lady, he behaved with a degree of indifference and formality that surprised and nettled her.

Mr. Hanna, in his normal or primary state, it will be recalled, was austere, dignified and scrupulously conscientious; even the minor vices had no place in his life. In a word, he appeared to be the embodiment of the highest ideals of the follower of Christ. In his secondary state he was quite another individual. Taken to see a vaudeville performance, a form of entertainment which he had severely frowned upon since his entrance into the ministry, he sat absorbed and amazed. Everything was new. The bright lights, changing scenes, witty remarks, brilliant costumes, daring feats and the toe-and-heel dance aroused childish interest and enjoyment. When asked if ever he had seen such a show, he replied in the negative, although in his student days he had undoubtedly been at the theater many times.

He was given two glasses of beer, and asked if he liked it, replying, "Oh, it tastes all right," not having any remembrance that beer had been known to him during his student days. Later, upon retiring he fell asleep and awoke in his primary self, with no knowledge of his having been to the theater. After remaining in the primary state for two and a half hours he fell asleep

for only one minute, awaking in his secondary personality, and said, "Dear me, I have the taste of that beer in my mouth yet."

He was taken by his brother to a brilliantly lighted restaurant, a place that was fairly alive with people and where the conversation was lively and stimulating. Stories, anecdotes, merry scenes and gay music filled the young clergyman with bewilderment, but having in his second personality only the education of a young child, the meanings and inferences of the remarks, while arousing mirth and outbursts of laughter in his brother, sorely puzzled him. He heard the strains of a mandolin, and wondered what could be the nature and form of an instrument that could produce such pretty and peculiar sounds. He was offered coffee, and though this was a common beverage before the accident, it now was entirely new. Upon another occasion he was taken to a zoölogical garden, a place he had frequently visited when in his normal state. He looked about with childish interest and surprise, like a child who had seen the pictures of animals in a book and who now for the first time saw them in life. One thing after another aroused his interest, curiosity and astonishment, as though he had never before seen them, although all had been familiar objects and commonplace things before the accident.

With the passing of time the frequent alternation of personalities, the gradual acquirement of knowledge during the periods of his second personality and the increasing information received from those about him of his mental dual existence, there came a moment when he clearly recognized the existence and differences of two personalities or mental lives. Struggles of the two for the possession of the body occurred, at which times Mr. Hanna would be in a dazed state and in neither one nor the other personality. What went on in Mr. Hanna's mind was quite accurately remembered by him, and is well set forth in a statement made by Mr. Hanna to Drs. Sidis and Goodhart.

Mr. Hanna stated that while lying upon a lounge in one of these dazed conditions he had engaged in one of the most intense struggles he had ever experienced. The two personalities, the

primary and secondary states, rose simultaneously and confronted each other. Each of them was the "I," still they differed from each other. The memories seemed to be those of two different persons, yet he recognized that both were his. He could not choose one because it differed from the other, nor could the two be joined. The struggle produced great perplexity and perturbation. He felt that both were his, yet it seemed impossible to unify them. One could not be abandoned, because both came up constantly before him as though exclaiming, "We are one, though different." It seemed as if each said to the other, "Thou art a mortal foe, and yet thou art bone of my bone and flesh of my flesh." Each, it seemed, had for a time tried to crush or suppress the other. The question in his mind was which of the two lives he should reject, and then the struggle was not so much to choose one as to forget the other, both persisting in his consciousness as though each memory was stronger than his will. Each memory seemed to be within the same physical being, as if there were two bodies alike, like twins, that lived entirely different lives, or like twins of the same body with tastes, faculties and natures very similar. The time came when he realized that he must take one or the other personality. The decision was difficult and the mental struggle great, but he finally decided to adopt both, because of the fear and anxiety that the struggle would be repeated again and again, and that the mental agony of these recurrences would be too great to endure. And so in time the two personalities, differing so much, were fused into one healthy, normal mental individual, into one Ego—or I—the present Mr. Hanna.

The passing of the hour permits of but an additional word. We are creatures not only of today, but also of yesterday. In the secondary personality of Mr. Hanna we found evidence as development proceeded of the presence of his primary state, and in the latter state of his secondary state. Time and again one state would force itself into the other, each for the time struggling for mastery, finally one letting go, as it were, the better or the worse state becoming for the time the Rev. Mr. Hanna.

In each of us the Ego, or I, is not a unity, but a duality, a blending of primary and secondary selves, of conscious and subconscious mental lives, of mental processes that, broadly speaking, express the human and animal sides of our natures. As one or the other may for a time dominate so are our personalities modified. As the speaker is uttering sentence after sentence he is conscious of the occupation of the mind with the phrases of the moment, but beneath this consciousness there lies a most potential mental life, or background, which, while seemingly latent or wholly beyond the field of consciousness or introspection, is extremely active—a life that embraces memories of past experience of self and countless ancestral individuals. It contains the fundamental structural material or sense-images or memories from which all our thoughts are built.

Our physical peculiarities are heritages that go back into the dim past, and they are expressions of causes that had origin beginning in time unknown; our mental lives are heritages that likewise have come to us through a countless line of ancestors for thousands of centuries. The impress of our progenitors upon our mental lives is not less than upon our physical lives. Just as each of us has an Ego that is a blended duality which is readily separable into two different selves, so has each of us a dual immortality—an immortality of the soul that is ours alone, and an immortality of the mind and flesh that is transmitted to our offspring and which passes from generation to generation. The emotions and thoughts of thousands of preceding generations, and the acts of the lives of the barbarians, savages, semi-educated, educated and cultured individuals who through the course of time have ultimately given us birth, echo and re-echo in our beings. Their personalities, like their bodies, have been born and reborn in their children and children's children, to be born and reborn for better or worse in ourselves and our offspring.

We tend to be boastful of our civilization, of the subordination of the animal to the human side of human nature, yet even the most superficial student of psychic life realizes that as yet civilization, especially in its international manifestations, is

founded upon a low level, and that, unfortunately, we have actually not passed beyond the very threshold of human enlightenment. Abolish law and religion, and civilized mankind would within a century revert to universal barbarism. The morality, the culture, the religion and the ideals that characterize the highest manifestations of our pretentious civilization are but a veneer that covers our greater subconscious mental life—a form of mental life that is our chief psychic heritage from untold generations of warring progenitors, and which, like the smoking, smoldering volcano, is likely to break into an eruption and overcome all. Break this fragile skin and Dr. Jekyll becomes Mr. Hyde, Dorothy is transformed to Becky, and the real Miss Beauchamp is changed to the Devil Sally.

Let us cast our eyes to the flaming horizon beyond the ocean and behold the highest ideals of civilization set aside for the ordeal of steel and blood; and witness between the rise and set of the sun the culture of a Dr. Jekyll transformed to the barbarous perfidy and diabolical savagery of a Mr. Hyde, leading to the greatest and most infamous tragedy in the history of mankind.

Is not truth stranger than fiction?

BASIS OF AMERICAN INDIAN OWNERSHIP OF THE LAND

By Frank G. Speck

Assistant Professor of Anthropology, University of Pennsylvania

The idea has always prevailed without bringing forth much criticism that, in harmony with other primitive phenomena, the American Indians had little or no interest in the matter of claims and boundaries to the land which they inhabited. This notion has, in fact, been generally presupposed for all native tribes who have followed a hunting life, to accord with the common impression that a hunter has to range far, and wherever he may, to find game enough to support his family.

Whether or not the hunting peoples of other continents, or even of other parts of America, have definite concepts regarding individual or group ownership of territory, I should at least like to show that the Indian tribes of eastern and northern North America did have quite definite claims to their habitat. Moreover, as we shall see, these claims existed even within the family groups composing the tribal communities. There is, indeed, considerable significance in the fact that these tracts were remotely inherited in the families and that they were well known by definite bounds not only among the owners, but among the neighboring groups. In many cases they were also associated with certain social clan groupings within the tribe. It would seem, then, that such features characterize actual ownership of territory. Popular misunderstanding of the hunting territory institutions among the northern tribes has occasionally led historical writers and administrators into the assumption that the northern Indians, particularly the members of the Algonkian* group, had no real claim, even among themselves, upon the land which we have come to value so highly.

*Throughout this article the word *Algonkian* denotes the linguistic stock; *Algonquin* is the name of a tribal division.

Mr. Roosevelt, for example, says, in "The Winning of the West":

"To recognize Indian ownership of the limitless prairies and forests of this continent (that is, to consider the dozen squalid savages who hunted at long intervals over a territory of a thousand square miles, as owning it outright) necessarily implies a similar recognition of the claims of every white hunter, squatter, horse thief, or wandering cattleman. In fact, the mere statement of the case is enough to show the absurdity of asserting that the land really belonged to the Indians. The different tribes have always been utterly unable to define their own boundaries."

His erroneous deduction is not only promulgated among his own readers, who may have no opportunity to correct it, but the statement, taken for reliable authority, is copied and quoted by other authors.

One of the results of my ethnological explorations in the interests of the Geological Survey of Canada among the tribes of the northern and northeastern United States and Canada, has been to trace the distribution of the family hunting claims and to study the social side of the institution, which is, to be sure, a fundamental one, throughout the Algonkians. Accordingly, I feel safe in presenting this preliminary report of the ethno-geographical material now, having pursued my objective studies through the tribes from the Atlantic seaboard in Newfoundland, Nova Scotia, Maine, the South Labrador coast and provinces of Quebec and Ontario as far west as Mattagama River and the north to Lake Abitibbi beyond the Height of Land dividing the Arctic and St. Lawrence water-shed.

Before entering upon the specific material from different tribes, let me define the family hunting group as a kinship group composed of folks united by blood or marriage, having the right to hunt, trap and fish in a certain inherited district bounded by some rivers, lakes or other natural landmarks. These territories, as we shall call them, were, moreover, often

known by certain local names identified with the family itself. The whole territory claimed by each tribe was subdivided into tracts owned from time immemorial by the same families and handed down from generation to generation. The almost exact bounds of these territories were known and recognized, and trespass, which, indeed, was of rare occurrence, was summarily punishable. These family groups or bands form the social units of most of the tribes, having not only the ties of kinship, but a community of land and interests. In some tribes these bands have developed into clans with prescribed rules of marriage, some social taboos and totemic emblems. Such, then, is the general aspect of this institution.

Regarding the territorial bounds, I indeed found them so well established and definite that it has been possible to show on maps the exact tract of country claimed by each family group. The districts among the Algonkians seem to average between two and four hundred square miles to each family in the main habitat, while on the tribal frontiers they may average from two to four times as large. I have already prepared such maps of the Penobscot territory in Maine, of the Timiskaming and Nipissing in Ontario, the Micmacs of Nova Scotia and Newfoundland, the Lake Dumoine, Timagami, Matachewan and Mattawa bands of Algonquins and Ojibways in Ontario and Quebec and the Montagnais and Mistassini of Labrador. In only one instance have I found this institution occurring among the Iroquois so far in my investigations. In this case the Mohawks of the Oka band possess a few family hunting territories, the idea evidently having been borrowed from the Algonkians occupying the same reserve. Mr. E. W. Hawkes informs me, concerning the Eskimo of Labrador, that while aware that their Indian neighbors maintain the hunting territory system, they have not taken it up themselves.

We have reason to know, indeed, from early historical writings, that the typical institutions of the hunting territory, with vested rights, so characteristic even today among the tribes of Canada, held sway among the Algonkian kindred as far south

as southern New England.* This brings the institution well within the limits of the region concerned in the treaty negotiations of our colonial government. Furthermore, on the assumption that the ethnically related Algonkians inhabiting southward into Virginia were organized similarly, we may have to conclude that all of the Atlantic Coast tribes maintained the same institution.

Another feature of economic importance in the institution of the family hunting territory was the conservation of resources practiced by the natives. In their own régime this meant the conservation of the game. Let us consult, for example, the native regulations governing the treatment of the hunting territories among the northern Ojibways and the Montagnais of the province of Quebec who are often accused of having been improvident as regards the killing of game, notwithstanding the fact that they depend upon it for their living. The Montagnais subsist entirely upon the products of the hunt, trading the furs that they obtain during the winter for the necessities of life at the Hudson's Bay Company's posts. Accompanied by his family, the Montagnais hunter operates through a certain territory known as his "hunting ground," the boundaries determined by a certain river, the drainage of some lake or the alignment of some ridge. This is his family inheritance, handed

* Quite definitely, indeed, can we interpret the meaning of what Roger Williams wrote of the Narragansetts in Rhode Island in 1643 in his quaint style. (Key Into the Language of America. Roger Williams, London, 1643.)

P. 189. "Secondly, they hunt by Traps of several sorts, to which purpose, after they have observed in spring time and summer the haunt of the Deere then about Harvest, they goe ten or twentie together, and sometimes more, and withall build up little hunting houses of barks and rushes, . . . and so each man takes his bounds of two, three or foure miles where he sets thirty, forty or fifty traps and baits his traps with that food the Deere loves and once in two days he walks his round to view his traps."

Further on, he remarks:

P. 193. "Pumpom: a tribute skin when a Deere is killed in the Water. This skin is carried to the Sachim or Prince within whose territory the Deere was slain."

Also, quoting "Good Newes from New England" (Young's Chronicle of Plymouth, pp. 361-62), cited in footnote in same edition, p. 193, Roger Williams Key, etc.

"Every Sachim knoweth how far the bounds and limits of his own country extendeth; and that is his own proper inheritance. . . . In this circuit whosoever hunteth, if they kill any venison, bring him his fee; which is the fore parts of the same, if it be killed on the land, but if in the water, then the skin thereof."

down from his ancestors. Here in the same district his father hunted before him, and here also his children will gain their living. Despite the continued killing in the tract each year, the supply is always replenished by the animals allowed to breed there. There is nothing astonishing in this to the mind of the Indian, because the killing is definitely regulated so that only the increase is consumed, enough stock being left each season to insure a supply for the succeeding year. In this manner the game is "farmed," so to speak, and the continued killing through centuries does not affect the stock fundamentally. It can readily be seen that the thoughtless slaughter of game in one season would spoil things for the next and soon bring the proprietor to famine.

The Montagnais depend largely upon the beaver, as there are very few moose and caribou in their country. The beaver to them is like the bison to the plains Indians or the reindeer to the Arctic tribes. The meat of the beaver is delicious and substantial and replaces pork very advantageously. If the hunter falls sick in the forest far from aid, he finds the castoreum a beneficial remedy. Different from the other beasts, the beaver does not wander about and require to be hunted; he builds his "cabin" in plain sight upon the very path of the hunter, in the river or lake. Instinctively, the hunter understands how Providence, by a wise law which no man or government or game commission can improve on, has placed the beaver there for his subsistence. He understands, moreover, that he cannot abuse this providence. Thus it is that the Indian, obeying a natural law of conservation, which is worth more than any written law to him, "never destroys all the members of a beaver family." He knows enough to spare a sufficient number for the continuation of the family and the propagation of the colony. He takes care of the beaver, and other animals as well, that live in his family territory, the same as a farmer does of his breeders. He can, indeed, tell at any

time the number of animals which he can dispose of each year in his district without damaging his supply.

The testimony of an Ojibway chief at Lake Temagami, Ontario, is interesting because it gives us a first-hand translation of the actual statements of an Indian authority himself. Accordingly, I offer part of the speech of Chief Aleck Paul.*

Having already given, in brief abstract form, the contents of some of my detailed reports being prepared for the Canadian Geological Survey, it may be well to continue in the same way by presenting condensed material showing the nature of the territorial institution among the various tribes embraced within the area of American and Canadian colonial movements.

* "In the early times the Indians owned this land, where they lived, bounded by the lakes, rivers, and hills, or determined by a certain number of days' journey in this direction or that. Those tracts formed the hunting grounds owned and used by the different families. Wherever they went the Indians took care of the game animals, especially the beaver, just as the Government takes care of the land today. So these families of hunters would never think of damaging the abundance or the source of supply of the game, because that had come to them from their fathers and grandfathers and those behind them. It is, on the other hand, the white man who needs to be watched. He makes the forest fires, he goes through the woods and kills everything he can find, whether he needs its flesh or not, and then when all the animals in one section are killed he takes the train and goes to another where he can do the same.

"We Indian families used to hunt in a certain section for beaver. We would only kill the small beaver and leave the old ones to keep breeding. Then when they got too old, they, too, would be killed, just as a farmer kills his pigs, preserving his stock for his supply of young. The beaver was the Indians' pork, the moose his beef, the partridge his chicken; and there was the caribou or red deer—that was his sheep. All these formed the stock on his family hunting ground, which would be parceled out among the sons when the owner died. He said to his sons, 'You take this part; take care of this tract; see that it always produces enough.' That was what my grandfather told us. His land was divided among two sons, my father and Pishabo (Tea Water), my uncle. We were to own this land so no other Indians could hunt on it. Other Indians could go there and travel through it, but could not go there to kill the beaver. Each family had its own district where it belonged, and owned the game. That was each one's stock for food and clothes. If another Indian hunted on our territory we, the owners, could shoot him. This division of land started in the beginning of time, and always remained unchanged. I remember about twenty years ago some Nipissing Indians came north to hunt on my father's land. He told them not to hunt beaver. 'This is our land,' he told them; 'you can fish, but must not touch the fur, as that is all we have to live on.' Sometimes an owner would give permission for strangers to hunt for a certain time in a certain tract. This was often done for friends or when neighbors had had a poor season. Later the favor might be returned."

Timiskaming Band of Algonkians

On the northern and eastern shores of Lake Timiskaming forming the inter-colonial boundary between Ontario and Quebec, are the Algonquins known as the Timiskaming Band. These people seem to be a northern offshot of the Algonquins of the Ottawa River. Many general features of the hunting territory system are repeated in the material coming from this group. There are seven original families in which the names are handed down by paternal descent. Here, as elsewhere, a common family hunting territory in which all the male members share the right of hunting and fishing, constitutes the main bond of union in the social life of the tribe. Hunting outside of the family territory was often punishable by death. More often, however, trespass was punished by conjuring against the offender's life or health. Each family, it seems, had some shaman in its ranks who could be called upon to work evil against intruders upon such occasions. Permission, nevertheless, was often given to hunt in neighboring territory; especially in times when game supply might be impovished, exchanges were made through courtesy. We find here rules for travelers in passing through strange territories. Permission was generally sought at the owner's headquarters before passing through his district, and if by necessity game had been killed to sustain life, the pelts were delivered to the owners. Economically these family territories in the Timiskaming band were regulated in a very wise and interesting manner. The game was kept account of quite closely, the proprietors knowing about how abundant each kind of animal was. Hence, they could regulate the killing so as not to deplete the stock. Beaver were made the object of the most careful "farming," the numbers of occupants, old and young, to each "cabin" being kept account of. In certain districts moose or caribou were protected during one year to give them a chance to increase after a period of hunting.

The totemic organization in the Timiskaming band is too

decadent to furnish much material for study. There are the remains of three totems, the kingfisher, rattlesnake and caribou. There is reason to suppose that these were introduced by intermarriage with the Timagami band. Nevertheless in this case the family divisions are not primarily concerned with totemism. The main point here is that the hunting territory groups have developed by inheritance from individual proprietors irrespective of totemic groupings. No taboos of diet or killing are found in these family groups. They are purely social and economic. Some of the families forming the Timiskaming band originally came from the Matachewan band of Ojibways, others have come from the Abitibbi country and others are derived from the Timagami. From our study in this group it is safe to conclude that the pressure on the Timiskaming territory has been constantly from the west, the result of the continuous northward and eastward drift of the Ojibways, from the region of Lake Huron and Superior. This study, besides giving us a definite boundary line for the Algonkians on the west, also provides us with a concrete and presumably accurate illustration of how territorial encroachments occur among the natives, accompanied by intermarriage and interchange of customs.

The Timiskaming people, too, have only in recent years come under the Dominion regulations, their land having been ceded in the usual way so that now only a few families retain the right to hunt at all times in their inherited districts. My investigations among the neighboring bands of Algonquins are not very extensive, but we may presume from the fact that to the southeast the Dumoine River and Kipawa bands of the same group have the same social system that the whole Algonkian group was characterized by it. I found eight families forming these groups. Their territory extended as far east as Coulonge River which takes us fairly close to the country that is now settled, and where at first appearance one would hardly expect to find traces of aboriginal family claims. It may not be too futile to hope that in the further prosecution of these researches among the diffused remnants of the original

owners, we may be able to plot out claims lying further to the south in what has been thickly settled country for some years.

Timagami Band

My best opportunity for investigating the social and economic organization was afforded by the Ojibways of the Timagami band, located at the Hudson's Bay Post on Bear Island of Lake Timagami. In my survey of the region I followed the line of contact between the Algonquin, Ojibway and Cree from Lake Nipissing northward, obtaining data from three or four of the intervening bands. The Timagami people offered a rather attractive opportunity because they had maintained the hunting territory system up to the present, and this, together with the small size of the band, ninety-five souls, enabled me to plan inquiries on a number of points concerning the life of the individual and the social group in a fairly concrete way. The Timagami band is the offshoot of Ojibways of the Great Lakes. Their present habitat is about Lake Timagami. There are fourteen families that form the group. As might be expected, the family hunting territory is of primary importance here, as it is throughout the whole region occupied by the northern Algonkian hunting tribes. We find the general characteristics of this type represented here by family proprietorship in the districts, retaliation against trespass, conservation of animal resources and certain regulations governing inheritance and marriage among the families. The districts of these family groups are fairly definite, bounded by lakes, rivers, ridges and often groves of certain trees, being exceedingly well known and respected by all the hunters, under a very strong sense of proprietorship. The Timagami even went so far as to divide their districts into quarters, each year the family hunting in a different quarter in rotation, leaving a tract in the center as a sort of bank not to be hunted over unless forced to do so by a shortage in the regular tract. These quarters were criss-crossed by blazed trails leading to the temporary camps. The Timagami called one of these territories "nda'kkim" (my land). While

omitting the detailed discussion of other social phenomena, a few words are needed to show how the clan system existed side by side with the hunting territorial system. Here there were four clans, the Loon, Kingfisher, Rattlesnake, and, of recent years, the Beaver brought in by an immigrant family from Lake Nipissing. In these clans descent is reckoned through the father and the exogamic regulation prevails. They do not believe in descent from the totem, the totem being regarded as a mark of identity to the members of the band. There is no association, outwardly, between the clans and the family bands. We infer, however, that the bands have increased by sub-division from the original founders who were members of three migrating clans. An examination of the territory as plotted on the map, which embraces a large area from Lake Nipissing to Height of Land, shows that these people are part of a northern and western movement of Ojibway speaking bands spreading from the Great Lakes to the newer hunting grounds which lie further from the territory now being despoiled of their game by encroaching settlements.

South of the St. Lawrence, in the region east of that just dealt with, the country has been in the hands of the white man for many generations, yet some of the most interesting material is alive in the memory of the original Indian inhabitants. The Abenaki of St. Francis, Canada, comprise the amalgamated fragments of the historic Wawenock, Norridgewock, Aroosaguntacook and other bands driven from southern Maine and New Hampshire in the eighteenth century. A visit to this village showed that some of the old family claims in the neighborhood of Moosehead Lake, Maine, are still remembered. Although I am not ready to report in detail as yet, the Indians will soon have a map marked out for me showing the former territorial claims of their people.

Penobscot

In regard to the Penobscots who inhabit the Penobscot River Valley in Maine, we encounter some interesting social and

economic phenomena. In the old days their hunting territories, which are called "Nzibum" (my river), bordered on the east those of the Aroosaguntacook, now the St. Francis Abenaki just mentioned. Almost all of the traditional twenty-two families of the tribe are still represented by descendants numbering something over four hundred. The usual rules against trespass, the usual habit of spending the winter in the hunting grounds and gathering for the tribal rendezvous in the spring and fall, and the typical grouping of the family members into bands in which the territories were inherited, are all found here as elsewhere among the northern tribes. Passing from this common phase, we find much more that is distinctive to the tribe in the social aspect.

To begin with, the human family groups were believed to be intimately related to certain land and sea animals, the relationship being accounted for by a myth of the transformer cycle of which an abstract will have to be given before proceeding further.

The mythical transformer, Gluskábe, "The Deceiver," in the course of his career about the world, encounters a village of his people, as he calls them, who are dying of thirst occasioned by the cupidity of a monster frog-like creature (Anglebému, "Guards the water"). "The Deceiver" proceeds to the abode of this monster and orders him to disgorge the water which he is holding back from the world. Upon refusal "The Deceiver" kills the creature and fells a yellow birch tree upon him. The water released from the monster then flows down the branches and trunk of the tree and thenceforth becomes the Penobscot River system. The event that ensues is of importance to us. The people below who are dying of thirst at once rush to the water as it flows by. Some of them are so eager to drink that they plunge into the stream and are forthwith transformed into various fish, batrachians and marine animals. Those who restrain themselves from the water escape transformation and become the ancestors of the human families. These, however, assume the names and to a certain extent the identity of the

particular animal into which their nearest relatives were transformed. Furthermore, they seem to have chosen their habitat near the places inhabited by their animal relatives. So we find those families with marine animal associations occupying hunting territories near the sea. Moreover, these families subsisted largely upon the flesh of the animal with which they are associated. Certain physical peculiarities are also attributed to the mythical relationship between the present-day human and animal families. To illustrate this, we find the Lobster and Crab families with territories restricted to lower Penobscot Bay, and the Sculpin and Sturgeon families farther up along the river. The former were notable as seafaring people and subsisted chiefly upon sea food. The members of the Whale family are still looked upon as being very large and dark-colored people. As regards the rest of the families having land animal associations, their origins are varied too much to be dealt with here. Some claimed descent from an ancestor who had lived with the associated animal, others through some pseudo-historical event concerned with the creature, while some others are thought merely to have taken an animal name from some particular species which abounded in their hunting territory.

Generalizing somewhat from my studies, which are treated in full in a work on the ethnology of the tribe, we find that the Penobscot families all had animal names, with descent in the male line. There were no taboos against killing the associated animal, which to a certain degree was depended upon for food. The term "ntútem" ("my spouse's parents," or in another sense "my partner of a strange race") was frequently used in reference to the animal, which after all is to be classified in the category of a totem. The family totemic groups included those related by blood, by marriage or by adoption. But no regular exogamy prevailed, because family identity was rather loose. The direction of marriage was largely arbitrary in the bands.

The following list gives the totemic names of the Penobscot families in the order of their location from the coast inland.

Lobster, Crab, Sculpin, Eel, Bear, Toad, Insect, Fisher, Whale, Beaver, Sturgeon, Wolf, Frog, Squirrel, Raccoon, Wolverine, Water Nymph (a human-like fairy), Otter, Lynx, Rabbit, Yellow Perch and Raven. Those highest in social rank were the Bear and Squirrel, from which the chief of the families having land animal totems was chosen; and the Frog and Sturgeon, from which the other side chose their chief. In a certain sense the totems were regarded as family emblems. Pictorial representations of them were used to mark the boundaries of the hunting territories. The families had their totems blazed upon trees along boundary rivers or employed figures cut out of birch bark as line marks.

Resolving our data to what might seem to be a reasonable conclusion, it appears that the usual Algonkian family unit concept has in the case of the Penobscots been developed along some independent lines. Some special influences seem to have caused an emphasis of the economic aspect of totemism, which is here apparently of a secondary nature. Nowhere else do we meet with quite the same thing. Finally, it hardly seems necessary to add that the social structure of the Penobscots has been obsolete for about fifty years. The territories extended from the coast northward into the interior as far as the St. John's River, those in the northern interior being of a much greater size than those nearer Moosehead Lake, Penobscot River and the coast. The latter average about 500 square miles, while to the northeast they are often twice that extent. We might be tempted to infer from this that the Penobscot migration drifted southeast originally.

Regarding the Passamaquoddy of the eastern coast of Maine, my material, as yet incomplete, only permits me to state that the economic phenomena resemble those of the Penobscots. The Malecite of St. John's River had their hunting territories too, but I am not prepared to give them yet. Here, however, we learn that personal nicknames were often derived from the animals most commonly hunted by individuals.

Micmac

Lastly, as regards the Micmacs of the extreme east, inhabiting the maritime provinces of Canada and Newfoundland, we find the data to be much less complex in character though no less fraught with ethnological importance. While my surveys in this region are as yet by no means complete, they cover already Newfoundland, Cape Breton Island and parts of Nova Scotia. The general characteristics of the family territories of the Micmacs are fairly uniform, differing considerably from those of the Penobscots, despite the fact that both tribes belong to the same Algonkian sub-division.

The Micmacs term their hunting territories "ntugellwámi." The districts themselves generally surround lakes, ponds or sections of rivers, few being at any distance from water. The bounds do not seem to be as strictly defined as among the Ojibways, Montagnais and Algonquins, nor does resentment against trespassing amount to much. In the old days the families ordinarily spent the summer in villages located near the sea coast, and retired in the fall to their proper hunting claims, where they had temporary camps at convenient stations at intervals. There were no clans, no regulations of exogamy, and no group totemism. In this unelaborate social scheme we find even no remembrance of grouping of any kind under names. The immediate members of the family constitute the family group with its inherited hunting territory. These tracts, as a rule, remain intact as long as there are sons, grandsons or nephews in the male line to hold them. Nevertheless, gradual changes are taking place, as the districts may become subdivided in part among male heirs, and, as sometimes happens, they may be augmented by the addition of adjacent lots through intermarriage with other families or inheritance from distant relatives. Parts of territories are, again, occasionally bestowed as rewards upon friends for important services, such as supporting the aged or raising adopted children. The families themselves, as the simplest kind of social units, form villages which

seem to have some individual identity under local names. These exist nowadays as reservations, constituting small bands. Related and neighboring smaller bands in turn comprise the larger bands, determined more or less by geographical features, known as the Micmacs of Nova Scotia, New Brunswick, Prince Edward Island, Cape Breton Island and Newfoundland respectively. Each village has its chief and each band has its head chief, while the whole nation is represented by a hereditary life chief whose headquarters are at Cape Breton.

I mention these political points showing the relationship of the different bands in order to introduce another relatively important problem of migration which our study of Micmac hunting territories throws some light upon. By comparing the size of the family hunting districts in the various divisions of the tribe we discover that the farther eastward we go the larger the family tracts are. Those in Newfoundland, where there are thirteen family groups, average about 2,000 square miles to each, while in Cape Breton the sixteen family groups have an average of about 400 square miles apiece, and in Nova Scotia the average district amounts to only about 200 square miles. In its ultimate significance this comparison would seem to indicate that, in contiguous regions inhabited by branches of the same tribe, the country where the family territories are the largest is the country most recently occupied in the advancing frontier of the tribe. Hence, Nova Scotia was doubtless the center of distribution of the southern and eastern Micmacs whose line of migration has been continuously eastward, reaching Newfoundland within the last 250 years by approximate estimate. This inference is also supported by ethnological and historical material, obtained from the bands themselves, which I have treated in a more special article,* and from which I have quoted a little here.

A still more important conclusion may be drawn from this material, incomplete as it is yet. It confirms the idea, generally

* Family Hunting Territories of the Mimac-Montagnais of Newfoundland. MS. in press. Geological Survey of Canada.

supposed by ethnologists, that the earliest typical social unit of the Algonkians was the consanguineous family. In the north and east, under fairly isolated conditions, the family unit has remained most characteristic, but among the central and southern divisions of the stock a borrowed clan system has been superimposed upon the simpler family grouping. This offers an explanation for the existence of the more complex clan and totemic organization found among the Algonkians neighboring upon the Iroquois and the more typically southern phases of culture where the clan system is predominant. Moreover, the uninterrupted prevalence of the family unit and the absence of the clan system among most of the tribes inhabiting the lateral zone just north of the Great Lakes and the St. Lawrence is a very strong indication in favor of the supposition that this general region was the earliest habitat of the stock.

I hope later to extend the region covered by my territorial survey so that as many as possible of the contiguous boundaries of all the northern and northeastern tribes may be marked down. Then we shall be able to give actual boundaries not only to tribal groups but to dialects and to the distribution of elements of culture. This material, may, moreover, prove to have some value in the field of Indian administration should it ever be possible to reconstruct the boundaries of the Indian family claims in Ontario and Quebec. It becomes apparent by means of our study how, through misunderstanding between the colonial authorities and the natives, large tracts of land were sold by chiefs or by individuals who, from the Indian standpoint, had absolutely no claim to their ownership nor rights of disposal. We have also found out how this topic of ethnology, recently brought to light as a field of research, may enable us to trace the trend of migration in certain groups of American culture, besides furnishing us with material illustrating the gradation in social complexity from the simplest family kinship group to the totemic clan groups within the same stock. It is to be hoped that in the future ethnologists working in the field will enter this topic upon their programs of investigation.

TERRITORIAL EXPANSION

By Simon N. Patten

Professor of Political Economy, University of Pennsylvania

When this subject was selected last spring, our relations to Mexico were prominent. It was my thought to confine my attention primarily to adjustment between the United States and the regions to the south. Since then our internal problem has lost the public attention, while the same problems connected with Europe and Asia are in the fore. As I meant to refer to these European problems in connection with our own, it seems better at the present time to take the whole topic of territorial expansion into consideration, and to treat the burning questions of the day as well as our domestic problems.

Fundamental to the decision in regard to the expansion comes the question as to what type of state shall be dominant. One basis for determining state boundaries is the imperial concept that has come down from the Roman Empire. This assumes that an indefinite expansion is desirable, and that the power of the state should be exercised in a way to create a world-empire. The modern concept of national boundaries is either racial or economic. From the standpoint of race, the desire is to separate the various regions from one another, and thus give to each locality an opportunity to develop its local rights. The economic view of the state would join together those regions that have intricate economic relations, so that the state as a whole would be relatively independent of the outside world. Within itself would be manufactured the various things upon which national existence depends. This latter thought I wish to emphasize in contrast to the racial and the imperial concepts. If economic considerations are to dominate, it is plain that a world-empire is opposed to social interests, because there are several economic zones that

are relatively independent of each other. Any attempt on the part of any one region to extend its dominion to any other regions would tend toward economic and social disaster. An attempt to divide the world into racial units would be equally unfortunate. The fundamental difficulty with this plan is that states are too small, rather than too large, and hence regions are separated that are complementary parts of one economic union. With the one viewpoint involving the world-empire we have the exploitation of certain parts for the benefit of others. On the other hand, the racial viewpoint would materially reduce the economic resources of the world, and, as a consequence, would keep our civilization at a lower level than would result from a proper economic organization of the world's resources. There are thus overgrown states and undersized states, the overgrown states being those that extend over two or more economic regions, while undersized states are those that split a proper economic unit into two or more discordant parts. The only way of avoiding these evils is to put into the fore the reorganization of nations along economic lines.

Before taking up this problem it is necessary to face certain objections that have an emotional value to the American people because of their past traditions. These come mainly from constitutional restrictions imposed upon the American people in the nation's infancy before the necessity of enlarging our national boundaries was realized. The convention creating our national Constitution thought not of the conditions under which the American people were to develop. They were wholly concerned with the precedents derived from Greek and Roman history. The convention was a debating club on the relative merits of Roman centralization and Grecian decentralization. No thought of economic advantage or of an appeal to American conditions seems to have been considered. The result is that the original Constitution put in the foreground a series of restraints on social consolidation, as a result of which economic advance has been seriously thwarted. So

much time did the convention take up with the consideration of these ancient problems that they really forgot the end for which they came together; it is only through subsequent amendments to the Constitution that we have been able to pursue our onward path. The original Constitution had no Bill of Rights, the most important addition to public law the Anglo-American race has made. To remedy this came the first group of amendments. Since then many amendments have been made to the Constitution that in a like manner promote American social and industrial conditions, and by these means the Constitution has been made over into a workable scheme. The difference between restraints and traditions cannot be too much emphasized. Constitutional restraints have been meant to create barriers against evils from which other nations have suffered. As we have never faced these evils, the much-lauded restraints have proved detrimental rather than advantageous. In contrast to this, traditions and precedents grow up out of the social life of the people. They are the vital elements in the living Constitution of the American people. When restraints are thus made a part of the Constitution limitations they gain a fictitious value and seem of a higher class than the traditions and precedents of real American experience. They are, however, of much lower value, because they are mere academic statements of ancient or foreign experience without vital relations to American life. Each one must take his choice as to whether he believes in American traditions or in Roman or Grecian restraints; as he decides one way or the other, he acquires the attitude in which he faces modern problems. At the present time the American people are responsible not merely for what takes place within the boundaries of our own country, but for many of the most important events that are taking place elsewhere in the world. All this is particularly true of our relations to the states south of us, where our responsibility is plain and evident. Every anti-guided restraint is a duty shirked. Every precedent or tradition is a duty encouraged.

This demand for expansion is not merely American; it follows the precedents set by every other great race. What is the history of England but a series of these expansions, giving to the British Empire its present power and influence? No one, I am sure, however much he may dread Russian power, can look upon the expansion of Russia other than a benefit to the world at large. France also has undergone the same change; at the present time the old France is but a small part of the real France which now occupies so prominent a place in North Africa. It is this lack of expansion that creates the irritation on the part of the German people. They have been hemmed in from all directions by American, English, Russian and French limitations; and, as the result, we have the militarism of Germany which many of us dislike. It is, however, the natural result of the repression that other great nations have forced on Germany.

I state these facts as general principles arising out of the precedents that all modern nations have followed. There are, however, many serious obstacles to expansion that should not be overlooked. The primary one is a difference in race. The most vicious, however, of all, is a difference in language. It is not so much race difference as language difference that at the present time creates disturbance. Culture and social traditions also make obstacles; but long-continued intercourse between nations reduces these differences, and therefore we can anticipate that they will become less important as time goes on. All these, however, giving them whatever importance we may, should be subservient to economic interest. Race differences are not deep-seated enough but that contact and long-continued prosperity might overcome them. We have proof in America that different races can work and live together in economic unity. What has been done here can be done elsewhere if the proper conditions are provided. There is no reason why the putting of these economic principles in the foreground should not result in the solution of all differences, in so far as they are determined by race, language or culture.

Another view of expansion, one particularly important to America, is the difference between westward and southern expansion. For two centuries America has been expanding westward, until the limits of this expansion have been reached. There are no longer regions of importance within the Temperate Zone not occupied by an advancing population. This makes emphatic the southern expansion now beginning. If the world is to thrive, the southern regions that up to the present time have not been utilized, must be incorporated into the northern civilizations and made as much a part of the onward movement of the world as are the temperate regions at the present time. This involves more serious difficulties than those created by western expansion, but with steady increase in our power over nature, there is no reason why large areas of the South cannot now be occupied for productive ends. Under the older régime the southern regions were important only for a few minor products. Rum, sugar, fruits and spices have come from them; but, after all, they were luxuries and not necessities. The cost of transportation and the slow means of travel made impossible the bringing from the South the vegetable products for which it is best fitted. At the same time nature in the South was uncontrollable. This was due partly to the heat and the torrential rainfall of southern regions. There was also a lack of frost by which noxious tropical insect life might be destroyed. More than this, perhaps, were the effects of the tropical diseases which at that time were not under control. This list of obstacles to southern development looks large, and to many they seem to be unsurmountable conditions; but, after all, it will be found that the control over tropical nature has been very widely extended. Even now many parts of the tropical regions are not available, but certainly they have become so essential that no high civilization can maintain itself without direct and necessary economic relations to the regions to the south. The South also differs from the North in not having cold and hot seasons, but in having wet and dry seasons. This makes to southern regions the

problem of irrigation of greatest importance, because it is in dryer regions where the greatest advances can be made. Regions like Egypt, Asia Minor and parts of India can, through irrigation, acquire a type of civilization even higher than the regions to the north. These changes are helped out by the new canals and the new forms of political control. For a long time political control of southern regions must be exerted by nations to the north. The suppression of tribal feuds and of exploitation, as well as the suppression of local superstitions, does not seem possible in any other way.

A few years ago our diet was largely local, made up of wheat, meat and potatoes. So long as this diet continued the northern races were practically independent of the South. Now new forms of diet must be introduced to check the rise in the cost of living. The rice, sugar, fruits, bananas, have become an integral part of our diet, and there is no reason why dates, figs and like products should not also be incorporated in our diet, giving a stability and variety to it that no nation has as yet enjoyed. As to materials—we have scarcely begun to realize the possibility of southern regions, but rubber and vegetable fibers have come into use so freely that their importance cannot be overlooked. In this and in other ways the South has possibilities which would enable us to double our population and at the same time materially increase the intensity of our civilization. At least one-third of our diet and one-half of our material for clothing should come from the South. It is plain that the diet of the future must become more nearly vegetarian than at present, and as it does, the southern products will occupy a more important place.

We control the lives and morality of those who supply us goods or furnish us with service, and this responsibility is quite as great if the individuals who serve us live in a foreign land as if they are in parts of our own city or as members of our own family. It has been often asserted that trade follows the flag. It might be better said that moral responsibility follows commerce. There is no way of avoiding this larger

responsibility except by narrowing our moral horizon and rendering less effective the principle of social service to all mankind.

Let me make clear the principle involved. In primitive communities each locality is industrially independent, creates its own supply of food and satisfies its own wants. This simple economy of our forefathers is disturbed by the introduction of larger industrial units. The laborer now loses his industrial independence; he must go where capital is and have his situation determined by its needs. The laborers in Philadelphia are not there because they desire it; they are there because they are dependent upon capital for employment, and the capital finds its location in Philadelphia. Whenever this disturbance takes place, the community becomes from that time responsible for the laborers' condition. They are where they are either to create a higher return on capital or to create lower prices for consumers. The capitalist and the consumer, therefore, become socially responsible as soon as they take labor from its natural environment and put it in places where it satisfies the wants of the community at large.

Under these conditions it is short-sighted to assume that responsibility ceases at the crossing of political lines. The real question is, Have you as a result of your altered consumption or from your desire for a larger income forced laborers to move from their accustomed environment to surroundings where they serve your ends? If so, your responsibility is met only when the condition of the laborers is brought up to the normal level of the community.

In the copper region of Michigan, for example, many laborers have been aggregated to satisfy the wants of the nation and to secure profits to the owners of the mines. Neither mine owners nor the consumers of copper goods can disclaim responsibility for the evils existing in this region. They have created the conditions under which the laborer lives and must accept responsibility for the laborer's welfare. Our country and the world at large have many such problems. It means a moral

responsibility on the part of any community or class that has disturbed the natural conditions under which laborers have existed by forcing them into a new environment where their independence is subordinated to the general good. Exploitation and degradation are the results of these changes, unless a moral awakening on the part of the community brings to the dislocated population a return to their earlier social independence.

The first question, therefore, to ask concerning the region to the south of the United States is, Have we dislocated their industries? Has Mexico been disturbed by the demands of foreign consumers or foreign capitalists? If this is so, then the various commercial or national groups creating this dislocation are responsible for the disorder, confusion and misery prevalent in Mexico. It is not constitutional rights that we should uphold. Rather should we see that the conditions on which an industrial civilization depends are realized in Mexico. These conditions may be divided into three groups: political rights, economic principles with the resulting social responsibility and social ideals that are a consequence of our civilization.

I shall not attempt to formulate our political rights nor the principles of constitutional government that have followed their application to national life. It is, however, important that the economic principles and the social emotions of our civilization should be formulated so that we can see our responsibility and recognize what are the real motives prompting our action towards other classes or races. The economic principles are these:

1. The maintenance of order.
2. The freedom of exchange.
3. The education of the masses.
4. The ownership of land.
5. The security of capital.
6. The sacredness of contracts.
7. The prevention of industrial exploitation.
8. A living wage.

Political action must depend upon these principles or upon the social emotions that result from them. What we should insist upon in our dealings with neighboring states is not constitutional government but the reality of an industrial civilization. The question is not whether the Mexican constitution harmonizes with ours, but whether Mexican industry conforms to the conditions of a higher civilization. Our feelings toward the Russian people, for example, should not be determined by the fact that they have an absolute monarchy, but by the violation of economic principles that the present government in Russia may favor, or by the suppression of the social emotions that have become the common heritage of mankind. Only on one or the other of these grounds have we the right to interfere in foreign affairs or to demand conformity on the part of other nations to the principles which our civilization has evoked. We should be proud not of our constitution but of our civilization. Our guide should be justice, not liberty.

These newer ideas and standards profoundly modify our external relations. With those parts of the world in which our commercial interests are slight, we have little responsibility; but this responsibility increases as our trade and industry grow, and it becomes imperative when these interests are so dominant that regions with which we trade left to themselves would fail to maintain political and industrial stability. Our industrial relations with South America are slight and will always be so. No greater mistake can be made than to assume that the Panama Canal will make South America a part of our industrial system. We should view the Canal as a contribution to the general prosperity of the world in which we will gain, not as we seize or maintain control of South America, but as we share in the general prosperity that comes to all through industrial gains. A broader policy should be adopted towards the South American states. They should be made responsible for their own stability and for their own internal development. Our interest in them is no greater than in Africa or in Australia. We should take our hands

off and allow that progress to take place which will come naturally through their internal development. This means the withdrawal of our assumed control and the granting of complete independence on their part and also a complete responsibility for their own acts. They should be treated exactly as the Balkan States are now treated in Europe—as an independent unity that must struggle with and successfully overcome their own internal difficulties.

The situation is different when we consider our relations to Central America and Mexico. All of this region is an integral part of our industrial system. We cannot prosper without their prosperity, and they can maintain neither industrial prosperity nor political stability without our aid. To have our policy under these conditions controlled by sentiment is a fatal mistake. We must either control or let disorder continue, and if disorder continues not only will they suffer but we shall have corresponding losses due to the lower standard of life and higher cost of living thus imposed upon the American people.

Control may cost lives and may cost money, but lives are now lost in far greater number than could be through any effective policy of control. The waste of wealth under present conditions also far exceeds any loss that we might undergo in establishing permanent industrial relations throughout this region. We cannot draw an imaginary line between them and us without moral degradation on the one part and commercial loss on the other.

This control if properly exercised would create stable industry, a redistribution of population into regions now fitted for full physical development, and a movement of our colored population to the South instead of to the North, with a resulting mitigation of difficulties with the negro race. It would also mean a great extension of the field of capital and enterprise, offering inducements for saving and personal development which would otherwise be absent. But more than all these, we should think of the social uplift which would come

to all the tropical races through the improvement of their health and industry. There is no reason why this region for whose welfare we are socially responsible should not be made as prosperous and its population as virile as the northern races.

This creates new political problems, since our expansions in the past have been over territory of like industrial qualities and filled with people of similar traits and character to those of the adjacent states. Such a union as we have had in the past would not be advantageous under the more complex conditions which an expanding commercial policy creates. There is, however, no reason why we should not have *adjunct* states for whose social conditions and industrial prosperity we are responsible without creating the difficulties which would arise if they were admitted to our union. We must conscientiously face these industrial problems, whether they relate to our recent immigrants, to the colored race or to the races to our south. In the solution we could serve the world in as important a local sentiment which could not under any circumstances be powerful enough to prevent the aggressions of one locality against another. The same lack of common interests prevails in South America. Its mining industry creates abnormal conditions for the benefit of the world at large. We cannot expect a dominant class in such a locality to respect the interests of other classes. The only method by which the balanced prosperity of these localities, groups and classes can be insured is by some outside control imposing upon the whole region the economic principles and social emotions that have developed in the larger Anglo-American world.

Our policy towards Mexico should be based on these principles. We should break up the Mexican state and put in its place natural units, the people of which have common industrial interests and who would therefore feel any burden that may be imposed on some one class. There must in addition be an abrogation of class privileges. There should also be a definite policy about public utilities. These are so influential that they cannot be controlled by the different localities.

All this could be done without any break in our political precedents. It would, however, force a reconstruction of our economic ideals and a greater emphasis on our social emotions. Both these changes are much to be desired; if the Mexican situation leads us to a clearer perception of the economic and social principles on which our civilization depends, we shall not only be the gainers in our foreign policy but also in all our domestic relations.

Let me restate fundamentals to make my position clear. Economic interests should determine the extent of the region over which we exert effective control. In this whole region our responsibilities are the same whether a given portion be in or without our national union. We should not control regions like South America where our ties are sentimental. We should control Mexico even if sentiment on both sides of the national boundary is opposed. Social responsibility must dominate over regional feelings.

Two groups of sentiments are wholesome: the Anglo-American, which reflect our whole civilization, and those evoked by local interests. Class sentiments, regional sentiments, race sentiments, language sentiments and denominational sentiments are bad and should be displaced either by the broader sentiments of our civilization or by economic interests. To treat Mexico as a whole would be as fatal as to have treated the South as a unit at the close of the Civil War. Had we done this an intolerable situation would have arisen only solved by another war. We want no southern sentiment, no eastern or western sentiment, no more than we want Irish, German or Jewish sentiment. Mexican sentiment is a bar to their progress and to ours. It should be faced and suppressed just as southern sentiment was fought and defeated.

Local political units should be economic and so demarked that people of similar interests can act together for common ends. No other sentiments except those generated by our whole civilization can be tolerated. That which goes beyond the locality should be broad enough and true enough to arouse

all men. Interests are local; sentiments are universal. We should avoid the mistakes now committed by England in relation to Ireland and South Africa. Irish and South African sentiment is regional. Like southern sentiment or Mexican sentiment or the class sentiments that are now forming, they are against social welfare and should be repressed. Only as they are blended into a larger unity that is not regional or class can our civilization expand and flourish. Both regions and classes must lose their emotional appeal in the march of events giving to localities their economic rights and to the whole world one religion, one future and one civilization. Away with all besides this goal in which political, economic and social interests unite into a harmonious whole and lift us above the strife of regional and race emotions.

VERGIL AND THE BAY OF NAPLES

By Walton Brooks McDaniel
Professor of Latin, University of Pennsylvania

The purpose of this lecture is to take you, in your imagination, to the region around the Bay of Naples, and consider its associations with the real Vergil, with the Vergil of medieval tradition, and with aeneas, the hero of Vergil's "aeneid." This paradise of beauty inspired the well-known Italian proverb: "Vedi Napoli e poi mori" (see Naples and then die). I am afraid that some of you, after spending a week or so in summer amid the city's dirt, diabolic din and phenomenal impositions and impostures, have come near fulfilling the dictates of the proverb in all its literalness.

And yet the Neapolitans could not belong to that most lovable race, the Italian, without having an attractive side to them—at least, when they are asleep. The life of the city of Naples itself is, of course, fascinating to a degree. There is a touch of the rural about it when you see the cows milked at the front door, and the purchaser wrangling with the cowherd because his energetic hand has filled the receptacle with a major amount of froth, or when you see the goats stalking up the stairs to an upper story to deliver their own milk at least unadulterated.

The student of ancient life will have his special pleasure, as he observes the shrines hung with votive offerings, the outdoor cooking, the public story-teller nailing his crowd to the street corner, or some shower of refuse descending from an upper window unheralded by the thrower and often, alas! anything but dry; for the like of all these things Vergil saw, smelled, heard and dodged some two thousand years ago. While I am really using these four verbs distributively, most of them are applicable, we must admit, to any one of the sights

which I have just enumerated. In spite of an enormous improvement during the last twenty years, all five senses still have to work simultaneously in Naples and often overwork.

But it is not the modern city, delightful in spite of its drawbacks, that must occupy our eyes and thoughts during the next hour. We are going back to an age when one could see Naples in all its loveliness and not die; the period, I mean, when Neptune ruled its waters and the Nereids were still popping out of the azure sea to "hear old Triton blow his wreathed horn." Moreover, our cicerone is not to be a direct descendant of Ananias, but he whom Dante chose to be his guide, the poet Vergil. He desired his company in what was, to his medieval mind, a far hotter and noisier place than even Naples, because, as he expressed it, Vergil was "quel savio gentil che tutto seppe" (that gentle sage who all things knew), the "mar di tutto senno" (the sea of all wisdom).

But we won't follow Dante in making our bard omniscient. It is only his commentators that are always that. His works contain a poet's measure of inaccuracies and inconsistencies that protect him from all charge of being prosaically scientific. The fairy realms his fancy lived in were never mapped; their waters never charted. His model Homer was, however, still less servile to the tyranny of fact. The Greek geographer Eratosthenes was rightly persuaded that scholars would ascertain the course which the wandering Odysseus steered only when they found the cobbler who made the leathern bag in which Aeolus sewed up the four winds of heaven.

Luckily, however, many learned men of antiquity were not so sceptical of Homer's statements as he was. Bards in particular have enriched us with poetic fancies, quite convinced that they could reconstruct with some degree of accuracy the log-books of the wily Odysseus and the pious Aeneas. So it is that we have various islands and promontories competing for recognition as the homes of the witch Circe, and of the even more alluring and retentive Calypso, who kept Odysseus seven years faithless to his faithful Penelope. More than one

locality also claimed the Sirens, the Cyclops and the troglodytic Cimmerians. Similarly the sailings in Vergil's "Aeneid," modeled though they were on those of the Odyssey and quite as fanciful as the dream-journeys that Kipling maps in his Brushwood Boy, acquired a reality that would have justified their delineation on an Admiralty Chart. What is more, the personal description of Aeneas which Dares Phrygius professed to give from autopsy in his immortal humbug, the history of the Trojan War, passed muster through the Middle Ages as thoroughly trustworthy. From this we learn that Aeneas resembled fair Helen of Troy herself in being red-headed; that he was robust, eloquent, affable, brave, but wisely so, pious—a fact which Vergil would seem already to have established with sufficient disagreeableness; that he had merry black eyes, and was, in general, a "lovely man," venustus, as a son of Venus, the goddess of love, certainly ought to be.

Moreover, the sixth century historian Procopius saw with his own eyes in Rome the very vessel from which the Trojan heroes landed on the shores of Latium. It was housed near the river Tiber, and was so well preserved as to have not a single indication of decay about it even after sixteen centuries. Teachers of Vergil may, therefore, inform their doubting Thomases and sceptical Marys on the authority of Procopius —not mine, if you please!—that Aeneas' ship was one hundred and twenty feet over all, twenty-five feet beam and had sufficient depth to make its one bank of oars strike the water properly. There was almost no iron about it; no splicing of timbers. Those who have further curiosity about details of naval architecture may seek the other specifications in the original Greek. I wish you joy!

Now, it is obvious that if all the ancients had been as matter-of-fact, unimaginative and literal-minded as a certain few, we should never have had either an "Odyssey" or an "Aeneid." Not that there is not much in both the epics that is quite realistic and faithful to life. For instance, we may feel confident that no mere landlubber composed the "Odyssey," much less the

Princess Nausicaa, as Samuel Butler, so gallantly argued. If an ex-farmer did write the "Aeneid"—as I suppose we must admit—it was one who had seen ships plough as straight a furrow through the sea as ever an agricultural implement through the soil; one who had watched the dolphins leaping from the billowy waters with all the zest of the goat gamboling in the meadows of Mantua; one who had gazed with awe on the white-capped mountains of the deep as well as on those that towered to the northward of his native village.

We have, in fact, reason to believe that after Vergil had been finally evicted from his farms, he spent most of his life in southern Italy and Sicily, hard by the sea, part of the time at Naples and near Nola, and that he made at least one voyage, and probably more, to Greece. Of course, sea breezes never do blow all the hayseed out of a rustic's head of hair, and it was too late in mid-life to transform Vergil into a John Masefield. In his description of the storm that assailed Aeneas he makes the waves rise so high as to disclose the sandy bottom in the trough between them, perhaps a reminiscence of some moment of terror and seasickness when the poet himself had such a yearning for terra firma that he could descry it even where there was none for mortal eye to see.

Naples was a city which a Hellenized Roman like Vergil might naturally find most congenial. It had been founded by Greeks from Cumae, and had always retained a measure of the old Greek life and tastes as well as many inhabitants of that race. Etymologically, Naples means the "new city," because the original settlement was either on the Pizzofalcone or on La Gaiola, and was called Parthenope; and when, later, Greeks occupied what is the heart of the modern city, they renamed Parthenope Palaeopolis, or the "old town," and called their own foundation Neapolis or "the new."

Parthenope owed its name to one of the Sirens, whose body was cast up on the shore there, and her tomb was actually pointed out at a later age, even as you may still see in or near Rome such verities as the last resting place of Romulus, the

founder of the city, or the sepulchre in which they laid away two-thirds of the Horatii triplets. Tombs are always convincing, for dead men tell no tales and there are no tales that a living guide is ashamed to tell.

The derivations that etymologists propose in one age become the ridicule of the next. In a "Life of Saint Athanasius" we find the delectable assertion that Vergil called Naples Parthenope, or "the virgin city," because of a certain marriageable girl who dwelt there, but the emperor Augustus insisted that its name should be Enneapolis, meaning "mistress of nine cities." You will observe that there is an extra syllable in this word, but that would never balk an etymologist, much less spoil a story. The Life then states that it is a patent absurdity to interpret Neapolis as meaning "new city," since it was so old that the date of its foundation was unknown. So speaks the ancient wiseacre, who is wrong, of course, but no more so than many of his industrious successors.

Among the cities of Italy, contemporary Naples is the most populous. Its narrow streets, into which the sun has to look through a mere slit, represent for us rather accurately those of ancient Rome. And yet, in spite of its crowding, its distances are discouragingly great to a pedestrian. In Vergil's day its area was limited to the mere core of its present circumference, but the boundaries are given so divergently by different guessers and diviners in our brotherhood of scholars that we have no time to discuss their hariolations here.

Naples played an important part in the career of our bard. Here, we learn, he took lessons in Greek and mastered the rules and technique of the Alexandrine school of poetry with a rather voluminous writer, Parthenius, as his private tutor. In this city, too, Vergil is believed to have composed the bulk of his Georgics in the years between 31 and 29 B.C., far away from his boyhood home, the memory of which was his real inspiration. But even in these thoroughly agrestic poems, full of the farm-life of the Mantuan territory, one may discover tokens of his new experiences down by the Mediterranean.

A few years earlier Marcus Agrippa had united the nearby Lucrine Lake with that of Avernus to form a new haven for ships, the Julian Harbor, and Vergil refers, certainly as an eye-witness, to the mighty blocks of stone that bulwarked the Lucrine against the assaults of the outer sea and to the baffled billows that thundered in rage against them. Elsewhere he tells how the marine engineers tumble the great rocks into the Baian waters, swirling the murky sand to the surface and making the neighboring islands tremble with the shock. We have, furthermore, in the Georgics his pen-picture of a vast cavern, eaten out of a mountain side, into which the wind drives the waves, the haunt of Proteus. For this, of course, he may have depended somewhat on a similar description in the "Iliad" of Homer; but he assuredly needed no inspiration from his model if he wrote it after visiting any one of many caves on the Neapolitan coast and islands. Even the world-famous Blue Grotto was once readily accessible from the sea before Capri sunk to its present level in the circling waters.

Vergil's newly acquired intimacy with the Mediterranean is also attested by his picture of the great combers, curling and whitening far off shore and finally crashing against the cliffs with deafening roar and churning up the sand from the seething depths. The epithet which he here applies to the word for sand is not what you would expect, the adjective that means "yellow," but niger, which signifies "black," and this, therefore, indicates that he had seen the waters by the Bay of Naples made murky with volcanic sand. The black particles of pulverized lava and other volcanic débris are very noticeable, for instance, on the beach between Baia and Pozzuoli.

Then there are other marine pictures which the poet paints all the more vividly for us in that he could never have seen the like of them in his boyhood home; for example, the broad table-rock over which the waves tumble in the storms of winter, although at other seasons it serves the birds of the sea, the ancestors of the gulls that pursue every liner of today up the bay to Naples, as a welcome basking-ground, or that other

rock of the sea to which Latinus is likened for steadfastness. Waves by the thousand bark impotently about it, now lashing its covering of seaweed, and now letting it fall idly from its side. Equally memorable are the verses in which Vergil recalls to every lover of the ocean shore the roll of the shingle, as the ebb of a spent wave sucks and drags it down the steep strand.

It was at Atella, north of Naples, in this same land of Campania that Vergil read his Georgics to Augustus in B.C. 29, upon the latter's return from his naval victory over Antony and Cleopatra off Actium. The recitation required four days, it may be because of encores, or it may be that Rome's ruler was a poor listener. The poet's physique was always far from robust, and so we learn that whenever his voice weakened during the reading, Maecenas, the great patron of literature, would help him out with his task. In ordinary conversation Vergil was notoriously slow of speech, but as a reader he could hardly be surpassed. Even what seemed commonplace took on new meaning under the magic of his elocution. How his ghost must shudder, therefore, at our so-called expressive reading of his verses, the merry sing-song, the staccato pounding of the ictus, the triumphs of quantity over quality, and bad quantity at that.

One often wonders whether the slave of Trimalchio did any worse when he started to recite, "Meanwhile the billowy main was held by the fleet of Aeneas." "Such a disagreeable noise never penetrated my ears," one of his audience says; "for besides the exaggerated crescendo and diminuendo of his flighty and barbarous rendering, he jumbled up Atellan verses so that for the first time in my life Vergil actually jarred on me." But, when finally he finished, Habinnas applauded him and said, "He has never had any lessons, but I educated him by sending him to mountebanks at fairs. So nobody can equal him in his mimicry of muleteers or hawkers. He is a desperately smart boy; he can cobble, cook or bake anything just like a professional; a veritable jack of all trades." Such is the description that we have, then, of an ancient product—shall I say of vocational training or of a classical curriculum?—a youthful mur-

derer of Vergil's poetry. Yet, probably, even he knew enough to give his hexameter as many feet as a fly, while our boys try at times to rival the equipment of a centipede.

Tradition rather convincingly gives Vergil a country place near Nola and the village of Avella. The neighboring Monte Vergine seems to have been called formerly Mons Virginius, as a corruption some think, of Mons Virgilius; that is to say, the Mount of Vergil. At any rate, we have a story in Gellius, taken from one of the earliest commentaries on the poet, to the effect that in wrath at the people of Nola for their refusal to let him have water from their aqueduct for his estate, he cut out the mention of their city from his verse, and substituted another noun that was metrically equivalent. The words were vicina Vesevo/Nola iugo, and they became vicina Vesevo/ora iugo. His reference to Mount Vesuvius, however, stands, a memorial to the volcano that then dominated this entire landscape, as it does now in spite of its mutilated summit. But alas! it has long since ceased to be the innocent mountain that it still was in Vergil's day, when verdure covered it almost to the top.

During the last decade of his life our author was composing the "Aeneid" in his peculiar piece-meal way. He left it incomplete, and probably from his fastidious point of view, it would have still continued incomplete had he enjoyed the lifetime of a Methuselah during which to polish and repolish it. Actually he had to die at fifty-one.

Three of the books he read to Augustus and the emperor's sister, Octavia, just after death had bereft them of Marcellus. He was Octavia's own son, Augustus' adopted son and the destined heir to the throne. The circumstances of his death connect him with this region of the Bay of Naples, and have a quite modern aspect.

The emperor himself had recently been so seriously ill that his life was despaired of. His doctor, Amelius, strove to cure his extreme emaciation and what he diagnosed as arterial trouble, by the use of heat, going so far as to fortify his bedroom against any coolness by covering the roof with fleeces. But

no sudatory tortures could restore the victim. The time had come to change the doctor either for another or for the undertaker. The family chose to call in another medical expert, Antonius Musa. He did the obvious thing—put his overheated patient on the cold-water cure, pouring it over him and putting it into him, until lo! he recovered, shocked back to life again. The grateful patient and the Roman Senate lavished financial rewards upon him, gave him, though a freedman, the privilege of wearing gold rings on his fingers—a great help to a practitioner provided they look expensive!—and exempted him from paying taxes, which is a great help to any man. Next, poor Marcellus came upon the scene, a dying man also. Dr. Musa again did the obvious thing—put him on the cold-water cure, until lo! he died, also shocked; shocked to death in his eighteenth year. As some of my best friends would say, there was a good deal of "error" in this case. Marcellus had one to his account, and Dr. Musa certainly had one to his. But in the doctor's mistake one might see the irony of fate, for Marcellus was actually at Baiae where volcanic springs provided all the heat and hot water that the sickliest man could need, and the latter so full of smell and bad taste that any ailment would have had to yield to it.

Horace amusingly assumes that Baiae is enraged with him, because on the prescription of this same Antonius Musa he is ignoring it, the natural panacea for all morbidity, and instead is somewhere in the north taking cold-water baths in midwinter. But depend upon it, that lover of comfort, Horace, never froze his poetic person for long, and as a lover of wine, never subsisted for long on our American national drink.

To come back now to Marcellus, Vergil's allusion in the "Aeneid" to this really national bereavement so affected Octavia that she swooned away and herself nearly died. In the Middle Ages his successful play upon the mother's deepest emotions seemed to deserve some reward, and so we have those fantastic tales that made Vergil receive $5,000 for each line, or the rulership of Naples and all Calabria for the entire passage, or even his enfranchisement from a state of slavery. We wonder

whether the last yarn, which implies that he had been the slave of Augustus, was not a penalty that he paid for his servile flattery of the Julian family, which some critics reckon the only serious blemish in his masterpiece. The version of the story that bestows upon him the overlordship of Naples and Calabria is more readily explained. It arose from the misinterpretation of a distich which even early biographers declare he composed for his own epitaph as follows: "Mantua was my mother; Calabria took me away; Parthenope has me now. I have sung of pastures, of the country and of leaders of men," the last being, of course, a poetical summary of his three works: the "Eclogues," "Georgics" and "Aeneid."

But no perversions of history will seem odd to one who finds later writers figuring out, for instance, the relations of Vergil to his contemporaries in this fashion: "When Julius Caesar was the head of the empire, Brutus Cassius was ruler of the twelve parishes of Tuscany, and there arose war between Caesar and Brutus Cassius, with whom Vergil was living, and Brutus was conquered by Julius; and after this Julius was killed by a blow with a stool." Of course, there isn't one thing right in that entire fabrication, although it is conceivable that Vergil, during his life at Naples, did have some contact with Brutus, the assassin of Caesar, for his villa was on the island of Nisida.

But Roman history and Italian geography become finally even more perverted, and I cannot forbear to give you another instance, since it concerns Vergil and prepares the mind for ruder shocks when we come to consider his metamorphosis into a magician. This sets forth that he was the son of a knight of Campania in the Ardennes—one of the friends of Rosalind, perhaps—and of a daughter of a Roman senator under the emperor Remus, who killed his uncle Romulus, and was succeeded by his son Perseus, in whose reign Vergil studied at the University of Toledo.

But Vergil's epitaph should already long before this have conducted us to his tomb, where we must presently lay him

away. Some time previous to 23 B. C. his dear friend, the lyric poet Horace, had written him a farewell poem or propempticon, for some trip to Greece, praying the deities of the sea to grant him a safe return. Whether Vergil ever went on that particular voyage we do not know, but in B. C. 19 he did sail for that land and Asia Minor. At Megara he received a touch of the sun that was too heavy for his delicate head to endure, and, returning to Brundisium, he quickly passed away. This is the tale that sober history tells, but medieval legend puts it otherwise.

It seems that he had made a head out of iron which could foretell future events. And so, on setting out for Greece, he had questioned this portable oracle as to whether his trip would prosper. "Yes," it answered, "provided you take care of your head." The reply made him more careful of his piece of mechanism, but he was correspondingly careless of his own cranium, and so perished by sunstroke. As he lay on his deathbed, he called repeatedly for the manuscript of the "Aeneid," being resolved on burning it; but to the ineffable joy of generations of schoolboys, the work was saved. His bodily remains were brought back to Naples and deposited, his biography tells us, in a tomb about two miles out on the road to Puteoli.

Perhaps no entombment has ever had such extraordinary results of a purely human and literary nature. Within a few generations the bard's sepulchre was regarded as almost sacred, and the tomb was visited as a temple.

One of Pliny's most entertaining epistles concerns the death of a later great epic poet, Silius Italicus, who, after an unusually prosperous life of seventy-five years, lost patience with an incurable malady and committed suicide on his estate near Naples. He had a monomania for collecting. He possessed several villas in the same locality, and was always losing interest in an old house in the joy of fitting out a new. His homes abounded, therefore, in books, statues and busts. Among the last was one of Vergil, which he almost worshiped. The poet's birthday he honored more religiously than his own, and his tomb at Naples he used to visit as a shrine. So speaks Pliny.

But as a preliminary to discussing in detail the part that this hallowed spot was to play in folklore and literature, we must try to portray what manner of man Vergil was before he entered upon both a heavenly and a worldly immortality.

We are fortunate in having contemporary record of him. He figures repeatedly in the works of Horace, who partly owed his own start as a poet to Vergil's introduction of him to Maecenas, the patron of literature and later prime minister, so to speak, of the emperor Augustus. A modern artist has painted for us the youthful Horace reciting to Maecenas, while Vergil and Varius, who introduced him, are standing in the background.

In the satire in which Horace tells how he made his famous journey to Brundisium on an ass, as the story goes, although every schoolboy since has made it on a pony, Vergil joined the suite of Maecenas at Sinuessa. When the latter, although a mature man, the Gladstone of his day, went to play ball, as might any youngster of today, it is notable that the only thing that prevented the greatest two Latin poets from joining him in the game was the sore eyes of Horace and the indigestion of Vergil. They both decided to take a nap instead. The physical ailments of the two are apparently the point of Octavius' witticism that when he was seated between them, he had on one side sighs, on the other tears. Perhaps if Vergil had substituted ball-playing even for his noonday siesta, he would not have had to struggle all his life with throat trouble, headache, spitting of blood and dyspepsia. On the other hand, it may be urged that his very abstemiousness from food and wine and the general continence of life that his physique imposed upon him may have led him to a more spiritual and poetic life. The difference even in his day between a saint and a voluptuary was somewhat due to blood-pressure and the count of red corpuscles, although his contemporaries were in happy ignorance of both these monitory measures.

Horace himself was a much less monkish character. Relatively pure though his language was, if we consider the general lubricity of his contemporaries, yet he could never have won for

himself the nickname Parthenias, the "virginal," as Vergil did in Naples by his maidenly modesty.

In another particular also the poets stand in contrast with each other. Horace admits that it was as sweet as honey to him to be pointed out on the streets as Rome's distinguished bard, while Vergil, we are told, had such a horror of what Oliver Wendell Holmes calls "the pleasure Horatian of digitmonstration as the whisper runs round of 'That's he!' or 'That's him!' " that he used to take refuge in the nearest house. No doubt, his author's heart was delighted that his "Eclogues" were recited to great applause in the theater soon after their publication, but what must have been his embarrassment on that celebrated occasion when the entire audience rose to their feet upon hearing his verses delivered, paying him an homage that was normally the privilege of the emperor alone. Remember that the Roman auditorium held no paltry thousand spectators, but in many cases five and ten or more.

Inasmuch as our Roman authorities emphasize in Vergil's character his unworldly simplicity and sincerity, his shyness and rustic appearance, his slowness of speech, approaching almost that of an ignoramus, we cannot blame the modern commentator for wondering whether Horace had him in mind when he speaks of the man who is hardly fitted to meet the keen criticism of his contemporaries, who can be laughed at because his hair is cut in somewhat country fashion, his toga flows too loosely from his breast, and his badly fitting shoe barely clings to his foot, but who is none the less a good man, such that there is none better, and a genuine friend, too, a man with a mighty intellect hidden under his uncouth exterior.

But while Vergil's fellow citizens, in spite of his abhorrence of publicity, would seem readily to have recognized his tall form and swarthy features, and his likeness figured as the frontispiece of his published works as well as in the libraries and school rooms of antiquity, we have today perhaps only one trustworthy portrait of him, the mosaic from Hadrumetum which emphasizes alike his rusticity and his dyspepsia.

In view of the extensive survivals from Roman days that other places on the neighboring shores may still boast, it is astonishing that Naples itself can show so little. Fragments of a temple of Castor and Pollux appear in the façade of one of the churches. There is a bit of the Julian aqueduct that once provided the naval reservoirs at Misenum. Lastly, by passing through one of the narrow streets in the slums, you may still see two arches of the very theater in which Nero made his début as an artist, sullying his imperial majesty for all time. The cathedral of Januarius, the town's patron saint, occupies the site once covered by pagan shrines to Neptune and Apollo. Thus, we have small means to rebuild the Naples of Vergil for our mind's eye.

In a city like Naples, which throughout its history has fully appreciated the value of sacred relics for protection and prosperity, the bones of Vergil were sure to be cherished. Quite as naturally less favored communities would covet them as a prophylactic. A certain English scholar named Louis wanted them so badly that he prevailed upon King Roger of Sicily to grant them to him, provided he could find them. The Neapolitans submitted gracefully enough to the search, confident that they had all that was left of the poet stored away in an undiscoverable place. But they deceived themselves; for Louis had been highly educated in the quadrivium and trivium, and, as the story goes, had so specialized in physics and astronomy—I am glad to repeat this tribute to those sister sciences—that without any external sign whatsoever to guide him, he did discover the bard's body in the heart of a mountain and in a perfect state of preservation. But now the Neapolitans would not let Louis have it after all. He had to content himself with a book on experimental science, the "Ars Notoria," which he found where you would expect to find a work of superhuman contents, beneath the dead man's head. This our informant says he himself tested, and he vouches for its wonders; but what they were we can only imagine, for the book long since disappeared and only the lie remains.

But here we are already in the very midst of what we may term the after-life of Vergil, the product of medievalism in its maddest and most whimsical mood. With it the distinguished Italian scholar Comparetti has dealt in detail, but also others whose studies may not be so familiar even to specialists in this audience. The more a Latinist studies the period half way between our age and that in which Vergil lived, the more the life and thought of the poet's own time seem modern by comparison. At present we must limit ourselves chiefly to such legends as might be important to a Vergilian student during a visit to Naples.

Nowadays, the marriage of Mr. Skinner to Miss Cheatum is no indication that their progeny will arrive at wealth by either fleecing or defrauding their fellowmen, any more than the name of Drinkwater will save a man from a career of bibulous ecstasy. But that is not the way they looked at it a thousand years ago. Vergil's mother had not been called Magia Pollia for nothing. Magia was the word for magic and a man could hardly be a son of sorcery without being himself a sorcerer. Furthermore, though his own name, as later spelled, Virgilius, was probably in reality of Celtic origin and innocent enough in meaning, it could not escape the superstitious mind that it resembled the Latin word virga, which signifies a "staff" or "wand." It was, therefore, unquestionably prophetic of the time when he would be using a wand as a great magician. Again it was quite unthinkable that a poet whose wisdom and learning had appeared even to his contemporaries to transcend mere mortal limits could have been born without some miraculous presages of his future career. These tradition has introduced in a mild form even into an early biography that has come down to us. We learn, for instance, that as Vergil entered this world of sin and sorrow, he did not salute it with a cry as the usual baby does, but accepted his birth with a placidity that foretold a fortunate future.

But in the estimation of superstitious ages there were other proofs that Vergil had been indeed a superman. His reputed

tomb happened to be near the great cutting through the volcanic hill west of Naples which is called the Grotto of Posilipo. It was too striking an engineering feat for the ignorant to account for except on the theory that it was the achievement of a magician. Who, then, could he have been if not that Master Vergil whose supposed tomb overlooks the entrance to this day?

The Philadelphian J. G. Leland found at least one story of this tunnel still current among the folktales of modern Italy. It appears that Vergil in the days of his lively youth once left the house of his sweetheart at midnight only to find it surrounded by assassins who were in the employ of his rival. He gave them, however, a hard run for their hire as far as a perpendicular wall of rock that seemed impassable. But before they could come upon him, he had a few seconds in which to recite an incantation which Mr. Leland renders as follows:

> Mighty spirit of the mountain,
> Ope thy rocky heart to me.
> Gentle sprite, I pray thee
> Have mercy now on me,
> As thou truly hopest
> That God may pity thee.

This opened the cliff for him, but when his pursuers reached the middle of the passage it shut together at both ends, so that they perished miserably. Some time after the bravi were sure to be sufficiently dead, Vergil freed the two entrances of the spell, and the Neapolitans have ever since had the use of their Grotto di Posilipo.

Moreover, in view of Vergil's increasing reputation for prescience and omniscience, it was to be expected that his "Aeneid" would not escape the allegorizing method of interpretation that converted even Ovid's villainous manual of seduction, the "Ars Amatoria," into an allegory of "Divine Love," a book which every Christian might read with profit. By this system of exegesis almost any hidden meaning might be foisted into

the poet's plainest language. We are not surprised, therefore, at the old story that says that St. Paul's great regret after he had landed at Puteoli and proceeded to Rome was that he had arrived too late to convert Vergil, who was so nearly a Christian already. And so we have those lines in a hymn, which even as late as the fifteenth century was sung at Mantua:

ad Maronis mausoleum
ductus fudit super eum
piae rorem lacrimae;
quem te, inquit, reddidissem
si te vivum invenissem,
poetarum maxime.

J. A. Symonds translates this:

When to Maro's tomb they brought him,
Tender grief and pity wrought him
To bedew the stone with tears;
What a saint I might have crowned thee,
Had I only living found thee,
Poet first and without peers.

And there is the further tradition that the Apostle set out to find the unknown spot where Vergil lay buried. When at last he discovered the subterranean sepulchre, such a fierce gale and so frightful noises issued from it that anybody but a St. Paul would have taken to his heels. But after stopping the hammers of two bronze gentlemen whose blows fell in such a way that nobody could cross the threshold without being killed by them, he entered the chamber. This was lighted by a lamp above and by two tapers on each side of Vergil, who was appropriately seated amid a profusion of books. Unfortunately, an archer stood in front, and, as Paul came in, he let fly an arrow, which extinguished the light, and everything at once dissolved into dust. So it was that the Apostle had to return to Rome without any of the works of Vergil that he had counted on securing.

If the pagan bard could be brought into such associations with Christianity as these, we may well believe what Johanet tells us, that an old-time guide who conducted sight-seers to Vergil's tomb regularly pointed out a chapel in the vicinity as the one in which the poet used to hear mass. And we still find in the "Dies Irae" that verse, teste David cum Sibylla, to testify to Vergil's authoritative characterization of the Sibyl as a prophetess of Christ.

The site of the columbarium—for that is what the tomb might more accurately be called—was probably more picturesque in former times. We hear much of a gigantic bay tree which shaded it until sympathy for Dante's death killed it. Here Petrarch planted a tree at the time that he was escorted to the sacred spot by King Robert. It lasted for generations, but finally disappeared under the constant pruning of the souvenir hunter. At the tomb of Vergil Italy's third great writer Boccaccio renounced the career of a merchant to become a poet and story-teller.

As soon as Vergil's name was associated with one magical construction at Naples, the Grotto of Posilipo, it was easy to make him the creator of still greater wonders, and so eventually all sorts of wild tales attached themselves to the Vergilian legend, some of them obviously of Oriental origin. Who that has been almost bitten to death by the insect life of this region has not yearned for the recovery of that bronze fly as large as a frog, which, placed upon one of the gates of the city, kept all its brethren away? As a sort of Italian Saint Patrick, Vergil drove all the serpents that infested the subterranean vaults and passages of Naples to a spot beneath one of the town gates. Such was the force of this tradition that when Henry the Sixth commissioned the Chancellor Conrad to dismantle the city, the latter, as we learn from his own letter written in 1194, dared not raze this particular portal, lest he let loose a plague of serpents on the inhabitants. The tourist of today would also welcome another product of Vergil's magic, that butcher's block on which all meat remained fresh for six whole years, all because

of a small piece which he had inserted in a receptacle in the wood.

While these stories may be known to many of you, you may not perhaps be aware that it was no less a writer than Pliny, living in a far more intelligent age, that was largely responsible for them. In full scientific sobriety he tells how in the consulship of Publius Volumnius and Servius Sulpicius there was a rain of fresh meat at Rome, and what is more, this godsend to reduce the high price of living did not putrefy like the steaks and chops that come from the butchers. This same authority claims that in the Troad there was a place where the flesh of animals sacrificed to Minerva remained untainted indefinitely. Furthermore, he mentions localities which were mysteriously free from certain creatures that were pests elsewhere. Thus, in Rome itself the Temple of Hercules in the Forum Boarium knew neither flies nor dogs. As for snakes, Pliny would have us believe that only the correct magic formula was necessary to assemble them into one locality for any purpose. But let us see what other fictions, circulated in the Middle Ages, connected Vergil with the Neapolitan region.

As one gazes today upon the crater of Mount Vesuvius, signaling danger to this entire territory by its smoke, he should think of those safer ages when Vergil set up a bronze statue of an archer, whose arrow, always on the string, kept the volcano in subjection by its menace. Of course, the day had to come when a rustic in ignorant wonder at the bowman's constantly militant attitude, drew the string. Off sped the shaft, straight for the summit of Vesuvius, struck the crater's rim, and so started the eruptions that since then have never ceased. This, too, is no isolated legend; for Olympiodorus speaks of a statue which repressed by its presence the activities of Mount Aetna in Sicily, and no doubt some of you have seen, as have I, far up the slopes of that volcano, the spot where a Christian effigy stayed the flow of lava in a recent eruption, according to the belief of the village that was spared.

Another Vergilian legend is attached to the Castello dell'

Ovo at Naples. This stands on the tiny island of Megaris, which belonged to the villa of Lucullus where Cicero met Brutus after the assassination of Caesar. It happens to be oval, and so would justify anyway its name of Castle of the Egg, but the story runs that Vergil built it and anchored it on an egg in the sea. This accounts for its title in an ancient document "Castellum Ovi Incantati" (the Castle of the Enchanted Egg).

Then we have that other yarn of the bottle in which he had put a model of Naples to protect the people against all enemies. Conrad seems to have believed in its prophylactic powers, for he states that the reason why he was able to destroy the city walls in spite of it was that the bottle had become cracked in his day and so lost its potency.

According to later tradition the palladium was not a model of Naples, but an egg. This developed into the statement that all Naples was balanced on a magical egg or on many eggs, so that it suffered seismically whenever its foundations rolled a bit.

A stronghold that preceded the Castle of the Egg on the same site must have been that Castle by the Sea into which tradition says the bones of Vergil were transferred. Conrad declares that he saw them and he proved the truth of the story that no sooner are they exposed to the air than the sky becomes overcast, the sea rises and the tempest roars.

As one would expect, there are localities near Naples which still bear the poet's name. The most extensive remains of the Gaiola region now visible above water have received the purely fanciful appellation La Scuola di Virgilio (the School of Vergil). But there is no need to make poor Vergil a pedagogue; it is bad enough to be a universal text-book for nearly twenty centuries of prosaic schoolboys. These buildings stood originally fifteen feet above sea level before the coast sank, and the school may have been a belvedere or a temple, either one of Fortune or that of Venus Euploea to whom Alexandrine ship-masters paid their thank-offerings after successful voyaging. Near by is the Scoglio di Virgilio or "Rock of Vergil."

But it was not Naples alone that Vergil blessed by his beneficence. Inasmuch as history declared that he had had an estate near Nola, legend finally picked a site for it on Monte Virgine (the Mount of the Virgin), which as a seat of worship of Cybele and Vesta had in Roman days been called Mons Virginum (the Mount of the Virgins), and next, so it is declared, had long figured as the Mons Virgilianus. Here the poet laid out his miraculous garden to cultivate every sort of plant that was of use in medicine. At Monte Virgine today they celebrate a festival which has an uncanny resemblance to a Dionysiac celebration, a survival, like much else, from Greek days.

Pleasing testimony to Vergil's popularity in the region around Naples which he came to know so well as a second home, has been found on the walls of Pompeii, which Vesuvius, less than a century after his death, destroyed for its inhabitants, but preserved for us. Not only full-grown idlers, but also schoolboys have left scratched on the stucco favorite verses, and the scribblings of the children may be sometimes identified not only by their inaccuracies of spelling or grammar but by the height above the ground to which the little hand could reach.

Perhaps the most remarkable among the quotations from Vergil that were found in the ruined city, when we consider the hush of death that finally settled over everything, are the words "Conticuere omnes" (Then all were silent). But the walls still speak, often telling a very human tale. Thus, it was surely some lover who relieved his love-sickness with a bit of hope by scratching the line from Vergil:

tu dea, tu praesens nostro succurre labori.

On the other side of Naples, too, the poet-magician made himself useful, if we are to believe the fabricators of this mad Vergilian legend. Thus, he provided the baths at Baiae and Puteoli, where the volcanic springs had been used for curative purposes from time immemorial, with plaster images and appropriate inscriptions to illustrate just what medicinal water

one should use for his special disease. We still have relics of the ancient buildings, but there is no use to hunt for anatomical models of gouty feet or rheumatic knuckles, much less for the infallible prescriptions. For down in Salerno was a medical school of great eminence in those days, and its faculty strongly rebelled against this piece of philanthropy. As the old chronicle quaintly puts it: "In defiance of all feelings of charity the doctors insisted on being paid." What was worse, some of them repaired secretly to the baths and ruined the tell-tale inscriptions. So ended this public dispensary. But God in his wrath, the story continues, punished the professors of the medical school, smiting the craft in which they were returning to Salerno by a tempest between Capri and La Minerva, so that all were drowned except the one man who had to survive in order to tell the tale.

You must have noticed that in all these narratives Vergil appears rather as an adept in what was called "white" or "holy" magic than in that baleful sort which is distinguished from it by the term "black." But, nevertheless, his powers were actually acquired in no Christian fashion. For, according to our earliest version, that of Jans Enenkel of Vienna in his Weltbuch of about 1250, Vergil was a child of hell, totally devoid of all moral sense; a heathen in religion but a warlock of great power, who attained his wicked learning without seeking it. It happened in this wise. While he was digging one day in a vineyard, he came upon a glass filled with what he supposed to be worms. When he picked it up, he heard a voice saying, "Vergil, let us out. We will protect you forever against all harm. Let us go into the fields, and we will teach you many arts which will give you joy and amusement to your dying day. We are in great distress, because there are seventy-two of us, all corked up in this little bottle." "Teach me the art," said Vergil, "and I will break the bottle and set you free." So they taught him all that they knew themselves, and then the poet opened their prison and the devils crawled out and disappeared. All the wonders that he later performed were attributed to his

compact with the seventy-two devils whom he released from their cramped quarters.

Another form of the story makes Vergil let a single spirit escape from the bottle, who directs him to a book on magic, hidden under the head of a dead man. But no sooner does the poet open it than out pop eighty thousand devils and place themselves at his command. Accordingly, he sets them to paving a long road.

Still another version describes the demon whom he lets out as increasing to such a monstrous size that his rescuer does not dare to leave him at large in the world and tricks him back into the bottle by saying that obviously he hasn't the power to enter once more its narrow neck. As a matter of professional pride, the spirit thereupon proves that he can return to his old quarters, and his crafty liberator claps the stopper into place, making him a prisoner until the end of time.

One of the few legends that reflect unfavorably upon the bard was that which says he was presumptuous enough to court a princess. She fooled him into believing that she would hoist him in a box at an appointed hour of the night to her boudoir situated at the top of a lofty tower. But she ran the elevator only halfway up, and left him to dangle there in mid-air until daylight appeared. Then his fellow citizens saw their austere bachelor and distinguished poet in a position which might well recall to a repentant mind the treatment that Aeneas had accorded Dido. The revenge which Vergil took upon this frolicsome damsel for the indignity that she put upon him will not bear description in polite society.

Let us pass now from our consideration of the actual life of Vergil in the region of the Bay of Naples and of that wholly fictitious career which legendary story later bestowed on him, and next follow the poet's hero Aeneas, as he coasted along these same shores. But in order properly to understand Vergil's use of the topography and mythology of this section of Italy, we must, of course, first consult his model, the "Odyssey" of Homer. For, even though we admit that that great

epic writer knew absolutely nothing about the Italian peninsula, and had only the vaguest notions of anything at all west of Ithaca, the home of Odysseus, yet it is the identifications of his purely fictional localities which the Greeks and Romans of later ages made with real places that controlled the topography adopted by Vergil in his "Aeneid."

Personally, I consider it a reasonable though disputable theory that the poet, or, if you will, the group of poets, whom we call Homer derived the elements of such Odyssean stories as those of the Cyclops, and Scylla and Charybdis from Phoenician traders, who, having found priceless opportunities for business in the far west, were not going to let competitors profit by them if a few lies and tales of terror would deter them from the attempt. It is, indeed, an attractive hypothesis that identifies as Phoenician the Phaeacians of Homer, those wealthy navigators whose ships rivaled birds in speed and men in intelligence; for unpiloted, the bard tells us, they found their way to any port they willed. But after all, a somewhat amusing reason makes this, we fear, an untenable view. You see the historic Phoenicians were traders, while the Homeric Phaeacians held in scorn and abhorrence all trade. They were sailors merely for the love of it, amateurs with no taint of professionalism about them, and when one of them, Euryalus, charges Odysseus with being no athlete but probably a mere sea merchant with a memory for his freight, taking home a cargo of much coveted gains, his fellow Phaeacians look upon his characterization as an insult to Odysseus, and the king later makes Euryalus atone for his rudeness by apologizing to the hero and by giving him a present.

But this theory that the topography of the "Odyssey" is ultimately based on statements made by Phoenician voyagers has been carried to its furthest extreme in a truly fascinating book by the French scholar Bérard. In his "Les Phéniciens et l'Odyssée" he claims that the Homeric work is merely a poetic version of the sailing directions of Phoenician navigators. Without at all subscribing to his main contentions, we may find

some of the identifications which he proposes in the course of his argument decidedly tempting.

But now let us lay our northerly course from Sicily, first with Odysseus and then with Aeneas to conform with the statements that we find in the majority of ancient writers.

The volcanic island of Stromboli, a member of the Lipari group, was one of the first of their pilots' seamarks. The smoke from its crater has from time beyond reckoning been used as a weather sign, and this perhaps as much as anything else has led to the selection of the island as the abode of Aeolus, the god of the winds and teacher of the art of navigation.

In our further voyage north we skirt a coast so exquisitely beautiful that we can hardly hope to duplicate it this side of Paradise. Salerno, Vietri, Cetara, Majori, Amalfi, Prajano, Positano, names full of music for places full of romance that one cannot see even pictured without a homesick yearning to visit them once again.

And now putting each jewel in its peerless setting, we have come to Positano, and it is time to consider that very serious question of where the Sirens lived. Their nesting place has been located variously by different discoverers. Being myself neither an ornithologist nor as yet a full-fledged and expert feminist, I forbear to theorize in detail upon this topographical problem. Some think that they have found some of their feathers—or was it their side-combs?—upon Cape Pelorum; others have traced their presence on the island of Capri, where the cliffs would certainly provide excellent outlooks for the man-hunting to which they were so devoted; others still locate them on the Promontory of Sorrento, where they had a temple in which people might worship them. A foolhardy layman is tempted to solve all these puzzling questions about their habitat by supposing that, being equipped with wings, the Sirens did not always roost in the same locality.

If you wish, then, you may picture them lined up on the steep bluffs around Sorrento, watching the shipping as it passed below, the prototype of many who still indulge in watchful waiting,

quite as musical, quite as pretty, but—thank heaven—without wings.

Personally, however, I should incline to seek their haunts not at Sorrento, but about half way between the end of the peninsula and Positano, where one can descry off shore a small group of islands, the Galli, Isole li Galli, as they are now called. Their ancient name was Sirenusae, and beyond any question they were what Vergil considered the home of the Sirens. As for Homer, he had, of course, no clearer notion of their position than we have of the Islands of the Blest.

A modern painter has pictured for us the piggery of the witch Circe. With a woman's intuition and sense of fitness, she has given the sailors of Odysseus temporarily the swinish form that really accorded best with their permanent dispositions. When Odysseus parted from her, his amative propensities foredoomed him, of course, to succumb to the courtship of the Sirens, had not Circe given him an emphatic warning. There is nothing like the discarded sweetheart for giving advice that will ruin the chances of the next woman who is to appear upon the scene! As Homer reports her words they were about as follows: First you will come to the Sirens who bewitch any man who goes their way. Whoso draws nigh them unwarned and hears the sound of the Sirens' voice, he never sees wife or babes stand by him in joy at his coming home; for sitting in the meadow they cast a spell of penetrating song. All about them is a great heap of rotting bones of men; bits of skin are shriveling on them. Therefore, drive your ship past and stop your comrades' ears with honey-sweet wax, kneaded soft, that none of the rest may hear. But if you yourself are minded to hearken to their song, have your men bind you hand and foot on the swift ship, upright in the mast-socket and let them tie the rope ends to the mast, that thus with delight you may listen to the Sirens' song. But should you beseech your men and bid them set you free, then they are to bind you fast with yet more fetters. How well Circe knew the susceptibility of Odysseus whenever any opportunity for a new trial-marriage should loom large

on his mental and ocular horizon! But this time venit, vidit, evasit, "he came, he saw, he got away," and the song the Sirens sang to him so fetchingly but for once so futilely proved to be their swan's note; for in dismay at their failure to secure a new victim, they committed suicide and became rocks. Would that some other unappreciated warblers would rejoice their neighbors by a similar act of self-petrification!

In Homer's time the Sirens do not seem as yet to have grown their wings, but there is very early archaeological evidence for their sprouting, and religiously and mythologically speaking, they belong to the same genus as the Harpies, Furies, Stryges and other such spirits of the dead, variations of the fundamental type, the winged Ker that thirsts for blood and love, like what we call a vampire. Seldom did our mariner have such a narrow escape from receiving his deserts!

From the Siren Islands our other hero Aeneas must have sailed beneath the stupendous cliffs of Capri, although it is in another connection that Vergil mentions it. Prominent in the seascape were the islands of Ischia, Procida and Nisida. The first two appear in the poet's extant works under their ancient names. Ischia according to one tradition was called Aenaria as having served as a station of Aeneas' fleet. On the Cumaean strand beneath the Promontory of Misenum the Trojans finally land.

Except for nearby Ischia, Cumae could boast of the oldest settlement of Greeks in Italy, although today there is little on its acropolis or concealed in its surrounding vineyards to suggest its quondam glories. No city was comparable for the influence it had upon Roman civilization, particularly in matters of religion.

In the sixth century before Christ there were current in the Hellenic world oracular sayings, supposed to have come from a mystic personage called the Sibyl, whose home was in Asia Minor. Today she would pass among medical men as psychic, among spiritualists as a medium who communicated with the disembodied dead, an ancient Mrs. Piper, shall we

say? Some of our more immediate ancestors would have labeled her a witch and penalized her for intimacy with the devil by a premature burning. The early Christians would have found her filled to repletion with evil spirits and proceeded to exorcise them, and so deprived her of all professional usefulness. The Jews might have esteemed her either a prophetess of Jehovah or one possessed of demons, according to what she talked about during her trances. But the Greeks recognized her and revered her as the mouthpiece of Apollo. Presently various communities began to possess their own private Sibyl. Thus, Cumae came to have hers, and through the Etruscans, it would seem, knowledge of her prophetic counsels and warnings had already reached Rome before 500 B. C.

It is hard for us in a more sceptical age to appreciate the significance of the Sibylline Books. They directly caused the transplanting of the worship of some of the most important foreign deities to Roman soil, and frequently and deeply affected the politics of the nation. There was, of course, some material justification for our stories about the Sibyl's Cave. The first Greek settlers found the hill on which they built Cumae honeycombed with passages and chambers, some being perhaps quarries from which earlier occupants of the territory had secured building material.

According to old-time story the Sibyl was one of the numerous morganatic sweethearts of Apollo. This must have been when she was young and buxom; for ancient marriage registers contain no record of Apollo's having ever wedded anybody who had lost her juvenility. One day he asked her to express any wish her heart might cherish with the certainty of its being granted. Like a fool she picked up a handful of sand, and demanded as many years as there were grains in it. She received, therefore, a thousand years, but it was no millennium for her. Long before she was willing to admit that she was nearly so old, she yearned for death and yearned in vain. If she could only have remained vigorous, or, at any rate, mod-

erately plump, she might not have cared. But after some centuries a sort of marasmus set in; she shriveled and shrank, and wrinkled and withered, until she bore a painful resemblance to that all but immortal grasshopper Tithonus, who similarly, you remember, received perpetual life without perpetual youth. When Trimalchio saw her, according to the novel of Petronius, she was suspended in a glass flask in all the misery and humiliation of her minuteness for unsympathetic tourists to stare at. And the small boy of Cumae would tease her with the everlasting inquiry: "What do you wish, Sibyl?" and she had only the one reply: "I want to die." At length, after having been reduced to nothing but a voice, although, to be sure, in her case that had always been the most important part of her, she died, in so far as that mere windy survival could be said to die; and in the days of the traveler Pausanias, the Cumaeans, although they had not a single oracle of hers to exhibit, did point out in their Temple of Apollo a small stone urn in which they claimed her bones were concealed. Some ruins hard by the ancient city are still labeled the Tomb of the Sibyl, but how could such a microscopic corpse require a tomb? At best it would be a cenotaph. We must refuse to credit the identification even at the risk of appearing sceptical.

The story of the Sibyl's decline and decease is, of course, responsible for more than one folk tale. Near Oldenburg, in Holstein, there was one current about a jolly dame who ate, drank and lived so merrily that she wished to continue in life for evermore. During a century all went well with her, but after that she began to waste away, until she could not walk nor stand, eat nor drink. Neither, unfortunately, could she die. For a time they used to feed her like a baby, but finally they simply hung her up in a glass bottle in the church of St. Mary at Lübeck. She is now no bigger than a mouse, but once every year she stirs a little, a proof that she has not yet resigned her earthly immortality.

We haven't time to recount how Aeneas insisted successfully

on receiving from the Sibyl a verbal prophecy, instead of submitting to her little game of solitaire with the wind-blown leaves, or how he entered the realms of Pluto, carrying quite properly his golden bough instead of a visiting card to Lady Proserpina. Nor shall I anticipate for any of my audience the sights that met Aeneas' eye in the world to come. The degree of reality that the poet assigned them is perhaps sufficiently indicated by the fact that he dismisses his hero from Hades by the Ivory Gate, the exit of false dreams, and not by the Gate of Horn.

But there was something more than the Sibyl in Cumaean territory that would inspire a poet like Vergil. Somebody told his predecessor Homer that there was a quarter of the world which at one season of the year practically had no day, and at another no night, but the old poet has made out of that arctic region two different wonder-lands. First, we have the country of the Laestrygones, where a sleepless man could win by daylight a double wage, that of a herdsman during half the twenty-four hours and a shepherd's during the other half; but then secondly that other land at the very edge of the world, where on the borders of Oceanus' circling stream live the Cimmerians, shrouded in mist and cloud, a people upon whom the sun never looks with his rays, neither when he climbs up the starry sky, nor when again he turns earthward from the heavens, but deadly night is outspread over these hapless men. Such is the picture that the epic poet gives of the place where his hero is to visit the dead. But it is only too true that even "Homer sometimes nods," and presently we find that Odysseus, as he wanders through Hades, has ample light by which to recognize his former friends.

Later literature sets the scene at Lake Avernus, but with what violence to the Homeric description you will realize to your very marrow if you visit that Cimmerian land on a broiling day of summer, when the mere sight of a cloud or the mere smell of a mist from the sea would seem the greatest of all earthly blessings. The justification of the identification of Avernus

with the Homeric and Vergilian entrances into the Lower World can be in no ways, then, of a climatic character.

One other locality near the Bay of Naples must finally engage our brief attention, the so-called Phlegraean Plains just east of Pozzuoli. As their name implies, they were thought to have been formerly on fire. Parts may well be said to be in that state today, as visitors to the Solfatara will attest. Here that super-dreadnought Hercules, with some assistance from the gods, fought the giants. Polybius says, quite to the point, that no other story of mythology has such a show of probability in it as this; for no other place could be better fitted by beauty and fertility to be the prize in a contest of deities. The Solfatara is a semi-extinct crater with numerous smoke-holes. A heavy stone dropped on the ground causes a report, they say, like that of artillery, and the sound of boiling from beneath the surface and the actual sight of boiling sand that looks precisely like seething liquid give the visitor an unpleasant impression that he is walking on the crust of a medieval Hell, and that his past life has not been all that it should have been. But all over this territory there are craters. If Daedalus, the first air-pilot of whom we know, flew over it on his wax-bound wings, as he steered for Cumae, he looked down upon geological conditions that were very similar to those that appear there today. They recall photographs that one has seen of the surface of the moon. At present, about twenty eyes stare up at the navigator of the air. These miniature volcanoes in some instances have cones within the circle of their craters, so that these look like the pupil of the eye, and make the comparison to that extent seem the more exact. This is responsible for an ingenious conjecture that it was tales which voyagers to the far west told Homer concerning the barbarous inhabitants of this "land of the eyes" that inspired him in writing his lively account of the Cyclops, the giant Polyphemus, whose one round eye adorned his forehead, until Odysseus, taking advantage of his drunken sleep, drilled it out with a stake of olive wood, sharpened and heated at the end to a glow in the fire. If the poet likens the

Cyclops to a mountain, it is, in the opinion of Bérard, because the Cyclopes originally were the mountains, these very volcanic mountains of the Phlegraean district. The small island, inhabited by goats, where Odysseus landed, is described precisely as Nisida might have been. The harbors correspond with great fidelity, and the two "Needles" that lie off the coast are the very rocks that the gentle shepherd hurled at Odysseus with a woman's aim.

I have now finished with the facts and fancies that concern Vergil, the pseudo-Vergil and Vergil's hero, trying to contribute something at least to each of the many sorts of hearers that I know I have before me. If the teacher grieves because I have not suggested some new interpretation of Aeneas' maltreatment of Dido; the scholar, because I have scrupulously avoided even the appearance of learning; the littérateur, because I have dwelt so slightly upon the poet's transcendent genius; the student of folklore, because I have not reproduced all the lies that the medieval mind concocted; the traveler, because I have not pictured for his fancy every brilliant in Naples' jeweled circlet—then there is the best of reasons why I should bring my lecture to a close with cordial thanks for your hour of patience.

SOME RECENT DISCOVERIES CONCERNING SHAKESPEARE

By Felix E. Schelling

John Welsh Centennial Professor of History and English Literature, University of Pennsylvania

It is a commonplace of literary biography that we know very little about Shakespeare and his works, and, like many other commonplaces, the statement, looked at fairly, is untrue. We do not know as much about Shakespeare as we know about people of his time that lived in the public eye, people that sat on the wool-sack or labored in diplomacy, that led armies abroad or entertained the court at home. But we certainly do know far more about Shakespeare than about any other man of his time who was similarly circumstanced; men like Christopher Marlowe and John Webster, for example, notable poets and dramatists in their age, so well known on the streets and in the haunts of the literary Bohemia of the day that no man took note of their coming and going. And the reason that we know so much about Shakespeare is to be found, not alone in the industrious researches of later scholars who live in this age in which the universal sovereignty of Shakespeare is acknowledged, but from the circumstance that Shakespeare was acclaimed and appreciated in his own day, that his own world talked about him, bought a larger number of editions of his plays in his lifetime than of any other dramatist, and left a greater number of mentions of him and allusions to his plays than to any of his competitors, if we except Ben Jonson alone.

Since the days of Nicholas Rowe's first critical edition of Shakespeare, the portrait of the dramatist has been drawn and his life taken (if we may put it thus) so critically, so insidiously, so incessantly and so feloniously, indeed, at times, that the circumstances that the man still lives is the most superlative

of miracles. Ben Jonson and Dryden trumpeted his fame. Pope and Dr. Johnson condescended to edit him. Drake and Malone realized his literary and dramatic environment; while Coleridge disclosed the profundity of his thought and the sanity and largeness of his outlook on life. Then came a new wave, the desire for more material about Shakespeare and his "traffic with the stage," and men like Collier and Hallowell-Phillips combed England with a fine-toothed comb for records and allusions to Shakespeare and his fellows, finding some, in the case of Collier, inventing others. It seemed that the book was closed and that the definitive life of Shakespeare had been written, howsoever every editor, newspaper writer and lecturer must do it over again in his own little way. But even in this trodden path new things have been found, and for him who will seek long enough and wisely there are even yet facts in store. Some of these things are trifles; none of them add to our knowledge of Shakespeare's poetry, which in the last analysis is the only thing that lives. But even trifles about a great name are worth while; and some of these discoveries are not trifles.

I. The first of the recent Shakespeare discoveries concerns the personal character of Shakespeare's father, sometime high bailiff of the poet's native town of Stratford; and it was made by the Rev. Andrew Clark, rector of Great Leighs, Chelmsford, in the year 1906. Mr. Clark, in the course of certain investigations into the history of Oxford University, came across a collection of the papers of one Thomas Plume, a clergyman, who founded the Plumean Professorship of Astronomy at Cambridge and bequeathed his collections to his native town of Maldon in Essex. Among these papers was a pocketbook in which Plume, after the manner of his time, was accustomed to jot down anecdotes and memorabilia. This notebook dates about the year 1656, just forty years after the death of Shakespeare. The links connecting Plume with the dramatist are Plume's friend, John Hacket, Bishop of Lichfield, the author of several Latin college plays, and Ben Jonson, who was the friend alike of Hackett, his junior, and of Shakespeare, his senior. Many

of the anecdotes thus noted in Plume's notebook are well known. Among them is a variant of a certain jocular epitaph, affirmed to have been made by Shakespeare on Jonson,* and little to the credit of his wit. The new anecdote is as follows:

"Sir John Mennis once saw his [that is, Shakespeare's] old father in his shop—a merry-cheeked old man, that said, 'Will was a good, honest fellow, but he darst have cracked a jest with him at any time.'"

The "merry-cheeked old man" is a descriptive bit that tells. We have long known of Shakespeare's father that he was improvident, falling from the high bailiffship of his town almost to a debtor's cell. He has been recorded a farmer, a butcher, a glover, a dealer in wool—he was doubtless all of these—and he is known to have had lawsuits and troubles of his own. It is good now to know him as "a merry-cheeked old man," a match for the ready wit of his ready son, even though it be whispered that old John preferred to make his honest mark rather than meddle with the mystery of alphabetic letters.

II. The second new reference to Shakespeare was found by Mr. Giuseppi and the two Messrs. Kirk in the Public Records' Office and first described by Professor Hales in a letter to the *Athenæum*, March 16, 1904. It will be remembered that one of the abuses of the Tudor system of taxation was the special assessment on certain classes of persons, granted by Parliament for designated royal or public purposes. A document has long been known among the accounts of the commissioners for the collection in London of such a subsidy granted to Queen Elizabeth by Parliament and in it is contained a mention of William Shakespeare as the inhabitant of a tenement in the parish of St. Helen's of Bishopsgate, and that he stood in debt to the tax collectors in October, 1598, to the amount of 13*s.* 4*d.* To this we may now add a newly discovered entry in the subsidy rolls, dated November 15, 1597, which shows that the same William Shakespeare was in default under the same circum-

*S. Lee, "The Nineteenth Century and After." May, 1906. "The Future of Shakespeare Research."

stances for the smaller sum of 5*s.* in October, 1596. Levy was made on his goods in each case and in accordance with the law. But the "new" record bears the annotation that the "said William Shakespeare" has "removed from Bishopsgate to the Liberty of the Clink in Southwark. Bishopsgate was in the neighborhood of the site of The Theater, the earliest playhouse to be erected in London; Southwark was across London Bridge on the Bankside and within the precinct of the Globe, where tradition relates that Shakespeare lived in the neighborhood of the Falcon stairs. Further information shows that in both cases Shakespeare paid up like a man, although his removal might have been plead against payment.

III. Shakespeare's coat of arms has inspired much comment pro and con. It appears that about 1596 "John Shakespeare applied to the College of Heraldry for a grant of a certain coat of arms, alleging that 'a pattern' (or draft) thereof had been assigned to him during his bailiffship of Stratford-on-Avon by Robert Cook, Clarenceux King-at-Arms. He further asserted that he had a right thereto because of his marriage with Mary, the daughter of Robert Arden, Esquire (descended from the noble family of Arden of Park Hall, who traced their lineage back to Guy of Warwick and the good King Alfred), and because of his descent from one [unnamed] who had been advanced and rewarded by King Henry VII for valiant and faithful services; and he declared his ability to maintain the estate of a gentleman." As is well known, there are two drafts of arms for John Shakespeare extant. The one bears date 1596; the other, three years later, and each is illustrated by a sketch of the arms, the later draft differing only from the first in the suggestion of a sketch quartering the arms of Arden with those of Shakespeare. Both of these are still preserved in the archives of the Herald's Office. But neither of them is signed and executed and, save for the circumstance that the family assumed them, there is no actual proof that they were ever really granted. Now this whole matter of the granting of arms is easily misunderstood. It was surrounded then as now by much ceremonial and accom-

panied at times by not a little pretence. There were then as now concomitant fees; and an ability and willingness to pay them was the first step to gentility, as a sufficient income to support the state of a gentleman was regarded—and justly enough—a matter essential. Worthy William Harrison, Shakespeare's contemporary and author of the "Description of England," prefixed to Holinshed's "Chronicles," described the Herald's Office as "the chiefest repository of lies." He says elsewhere:

"Whosoever studieth the laws of the realm, whoso abideth in the university, giving his mind unto his book, or professeth physic and the liberal sciences, or beside his service in the room of a captain in the wars, or good counsel given at home, whereby this commonwealth is benefited, can live without manual labor, and thereto is able to bear the port, charge, and countenance of a gentleman, he shall for money have a coat and arms bestowed upon him by heralds (who in the charter of the same do of custom pretend antiquity and service, and many gay things), and thereunto, being made so good sheep, be called master (which is the title that men give to esquires and gentlemen), and reputed for a gentleman ever after."

Two heraldic manuscripts constitute the third, then, of these new references to Shakespeare. Both of them date 1599, the year of the writing of "Henry V." The first is entitled, "A Brief Discourse of the Causes of Discord Amongst the Officers of Arms and of the Great Abuses and Absurdities Committed by Heraldic Painters to the Great Prejudice and Hinderance of the Said Office." This paper is in the hand of William Smith, Rouge Dragon, an officer of the court of arms. No mention of Shakespeare is made in it; but two of his most intimate associates and fellow-actors, Augustine Phillips and Thomas Pope, are accused of having "outraged truth and decency" in an endeavor "to secure heraldic badges of gentility," Phillips especially having claimed the arms of Sir William Phillips, Lord Bardolph, "with the said Lord Bardolph's coat quartered." Now the Lord Bardolph, thus claimed as an ancestor of one of

Shakespeare's fellow actors, was really a man distinguished for his bravery, at Agincourt especially. It may be remembered that in "Henry V," Shakespeare, too, sent a Bardolph to Agincourt. Ancient Pistol thus tells of his

> Fortune is Bardolph's foe and frowns on him,
> For he hath stolen a pax, and hangèd must a be:
> A damnèd death!
> Let gallows gape for dog; let man go free
> And let not hemp his wind-pipe suffocate.

But Captain Fluellen, that redoubtable Welshman, so believed in "the disciplines of the wars" that he was obdurate and this Bardolph was hanged. In view of all this we may accept as not wholly fanciful the idea of Sir Sidney Lee, that "the old warrior's title received satiric commemoration at Shakespeare's hands when the dramatist bestowed on Falstaff's red-nosed companion the name of his actor friend's imaginary progenitor."

The other heraldic manuscript contains, among other things, a list of twenty-three persons whom the author charges with having received grants of coats of arms under false pretences. And fourth in the list, alas, stands the name of Shakespeare. The paper, which is by one Ralph Brooke, a man apparently with a grievance, is a scandalous one and altogether *ex parte;* but we must regret none the less that the name of Shakespeare should stand thus pilloried with others of his class who were seeking elevation from the honorable bourgeois class to which they unquestionably belonged to a precarious gentility that could have meant little and must have cost them much besides the expenditure of money. Perhaps we may find a more charitable solution. To a man of Shakespeare's honest sense of inward worth it must have been at times gall and wormwood to bow the knee to some feathered Osric or take the affronts of every brainless Polonius whom age and office had raised on the ladder of fortune. Seldom has the sense of the degradation of mimicry and the contempt in which the actor was held been so

poignantly expressed as in the two sonnets in which Shakespeare complains how he has made himself "a motley to the view, . . . sold cheap what was most dear . . . [from whence]

> Comes it that my name receives a brand
> And almost thence my nature is subdued
> To what it works in, like the dyer's hand."

There is pathos in the situation of a man of sensibilities so delicate seeking the modicum of consolation that "the port, charge and countenance of a gentleman" could give him; and an interesting analogue might be drawn between Shakespeare, in this, and that sound piece of British manhood, Sir Walter Scott, who imaginatively placed the founding of a line of Scottish lairds above his repute of the author of his day, most read, most admired and most beloved.

IV. The fourth new mention of Shakespeare's name occurs in association with that of his friend, the famous actor, Richard Burbage. It turned up in the household account book for the years 1612 and 1613 of the steward of the Earl of Rutland, preserved at Belvoir Castle and published by the Historical Manuscript Commission. It was first announced in the *London Times* of December 27, 1905. It appears that in March, 1613, the steward of the Earl of Rutland paid Shakespeare "44*s*. in gold" for a design of an impressa or semi-heraldic pictorial badge with its attendant motto, and an equal sum to Burbage for "painting the same and making it in gold." The invention of devices of this kind was a fashionable pursuit of scholarly and literary men of the day, and we hear of Sidney, Daniel, Camden, Jonson, Donne and Drummond all as variously interested in them. As to Richard Burbage, he was, it will be remembered, the most notable actor of his day and the creator of the chief rôles of Shakespeare's tragedies, Hamlet, Macbeth, Othello, Lear and the rest. His connection, too, with pictorial art has long been known, as there is a portrait of himself of his own alleged painting in the Gallery of Dulwich College, long ago founded by his rival in the histrionic art, Edward Alleyn.

It has even been suggested, though by no means proved, that Burbage was the artist of the original portrait of Shakespeare, from which the engraving by Droeshout was made to decorate the title page of the first Shakespeare folio. The connection of Shakespeare's name with pictorial art is new but in no wise surprising when we recall the many-sided activities of the men of the Renaissance, Michael Angelo and Titian, for example, each of whom was painter, sculptor, architect, engineer and poet all in one.

We turn now to the several discoveries made by our fellow-countryman, Professor W. C. Wallace, of the University of Nebraska. I wish that there were place here to tell you at length of the sacrifices, the zeal and patience that have urged Professor Wallace and his wife to prosecute through years of discouragement a search through hundreds of thousands of parchment rolls in the Public Records' Office in London in the hope, sustained only by an idea, that here might be found some additional fact or reference that might bring us to a closer personal knowledge of the greatest of authors. Professor Wallace argued on the basis of probability. Here was Shakespeare, an active man, as busy, during the twenty or more years of his sojourn in London, in mundane affairs and in daily contact with his fellowmen as we know him to have been, incessantly engaged in creating the matchless fabrics of his mind. The probability that such a man would have come into contact with the law as plaintiff, defendant, witness, or juror was great, though no one before Professor Wallace had seriously considered it. He therefore determined "to read through the court proceedings of Shakespeare's London, in the hope of unearthing some document concerning the dramatist." But the magnitude of the attempt to discover any such traces in the midst of the hundreds of thousands of records, many of them untouched since their original filing away three hundred and fifty years ago, and most of them unindexed, might well have discouraged the most daring and patient of workers. Aside from the manipulation of the huge rolls of skins on which the old records were

transcribed, many of them trying to lift, by the strength of the one man, rare technical knowledge and practice in the crabbed writing of the day, an acquaintance with the forgotten law Latin in which much was recorded and industry extending over months, now lengthened into years, were required. We learn with wonder that these indefatigable workers have "handled more than a million documents, in order to find one case involving John Heming, one of Shakespeare's literary executors, and one in which 'Mr. William Shakespeare, gentleman' deposed certain things in person." And our wonder grows to admiration when we further learn that, timorous capital shrinking from investment where certain gains and certain advertisement of the munificent giver are not unmistakably in view, these devoted enthusiasts undertook their daring quest literally on their own responsibility. The history of Professor Wallace, like that of many a modest scholar, is summed up in the words, neglect, indifference, almost poverty; envy when success comes and effort to snatch from his hands the fruits of his faith and his toil. For soon after it had become apparent that here was one that was showing the way to innumerable additional facts affecting our knowledge not only of Shakespeare, but of most of his contemporaries, English "fair play" suggested a royal commission of Englishmen to take the work out of these "foreign" hands. I am glad to report that this commission, after the eating of sundry excellent dinners, left the matter exactly where they found it, and that "the reproach to English scholarship," as someone called Professor Wallace's activities in research, continues active and successful. I wish that I might tell you of some of the interesting things that are yet in store for us. But one of them directly concerns Shakespeare, but the rest will remake some of our history of the stage of his time.

V. Taking up what has already appeared, the first of the things that Professor Wallace turned up in the Records' Office were certain papers in the case of Shakespeare *vs.* Bacon, yes—this is no slip of the tongue—the case of Shakespeare and others against Bacon. We all know that Shakespeare has had during

late years a decidedly good case against Bacon, a case based on the rather foolish endeavor of sundry eccentric and uninstructed people to purloin from the dramatist, by means of ciphers, cryptograms and other barbarous weapons of offense, his ownership in his own works, to give them over to a certain brilliant, self-seeking, ambitious and corrupt judge, politician, natural and inductive philosopher named Francis Bacon. I am genuinely sorry to disappoint you. This is a case not unlike the great Homeric question, which you will recall was so obviously and decisively determined by that excellent presiding judge on the English bench of our Court of Common Sense No. 1, the late Lewis Carroll, author of the immortal "Alice in Wonderland," "Homer and the Homeric Question," said Judge Carroll, "why, of course nobody believes that Homer wrote the works of Homer any longer. That was decided long ago. It is all bosh. The works of Homer were written by another man of the same name." However, the defendant in Professor Wallace's newly discovered case of Shakespeare *vs.* Bacon was not even a Francis of the same name, but an obscure Matthew who, according to the poet's bill of complaint, dated April 26, 1615, one year and three days before his death, was alleged wrongfully to have detained certain "letters patents, deeds, evidences, characters and writings" concerning the title of Shakespeare and other plaintiffs to various houses "within the precincts of Blackfriars in the city of London." The answer of Bacon and the final decree against him form part of this matter. The inference as to Shakespeare is not an unimportant one, as it shows him actively interested in his business and property ventures in the city to the last, and not, as has hitherto been accepted, in his latter years retired from them as from writing for the stage. The final decree of the court directed the surrender of the papers in question to Shakespeare and his fellow petitioners. It is not known precisely to what tenements the bills in question referred. (I hope that you all share my satisfaction that this case should have gone against Bacon.)

VI. In October of 1909 Professor Wallace communicated to the *London Times* the rescript and translation of a document which has placed the business relations of Shakespeare to the two theaters with which he was associated, the Globe and Blackfriars, not only on a new, but on a definitive basis. The names of Shakespeare's fellow actors and immediate associates have long been known from many authentic records. It will be recalled that John Heming and Henry Condell were the two members of Shakespeare's troupe who, surviving him, signed the prefatory material of the first folio of the poet's collected work in 1623 and stood sponsors to it. Shakespeare died in 1616; Burbage, his fellow in the leadership of the company, three years later. Heming and Condell moved up to this headship of the company then by right of seniority. The document which we have now to consider concerns the first of these. It repeats that in the year 1611, Thomasina Heming, a daughter of John Heming, married an actor in the King's company (that is, Shakespeare's) named William Osteler. Thomasina was then sixteen years of age and she bore her husband a son who, it is interesting to learn, was baptized Beaumont, doubtless after the great contemporary dramatist of that name, then at the height of his fame. It appears that Osteler was admitted by the company as one of the sharers in 1612, and that, dying two years later, he left the administration of his estate to his young widow, then no more than nineteen years of age. Thomasina appears to have been as attractive as she was wilful. She was involved at one time in a romance with young Walter Raleigh, a sad young scapegrace, if we are to believe Ben Jonson, who ought to have known, as he was his tutor. The upshot of the affair was a suit by Thomasina against Walter—not for breach of promise, but for insult and slander, which she won with damages to the amount of £250. An appeal in this case was pending just before Sir Walter Raleigh's ill-fated expedition to the Oronoco, in which the younger Raleigh lost his life. But all this was later. To return to matters more relevant to Shakespeare, when her husband died, Thomasina procured

letters of administration, and delivered to her father, John Heming, two leases to be held in trust. These leases were for certain shares in the Globe and Blackfriars theaters acquired by her late husband.

"Within the year succeeding this delivery of the leases in trust, differences arose between father and daughter, with the result that Thomasina brought suit, had a lengthy Latin bill drawn up, and arrested her father for trespass, at the common law."

This suit was really aimed at Burbage, Shakespeare and the whole company, and (fortunately for us) in the preparation of Thomasina's complaint the lawyers found it necessary to recite at length the organization of the company during the period from 1599, the date of the building of the Globe Theater, to 1616, the year of Shakespeare's death. It will be remembered by all that the first structure specifically erected for a playhouse in the neighborhood of London was The Theater, situated in the precinct of Shoreditch, some half a mile north, on the road leading out of the city, by Bishopsgate, and a short distance to the left of that road. This playhouse was built by James Burbage, a joiner, and when he died, in 1597, he left it to his two sons, Cuthbert and James the famous actor. Now, it appears that when the Burbage brothers met with difficulty in renewing the lease for the ground on which The Theater stood, they determined to exercise a right, reserved in their deed, and remove to the Bankside in Southwark the material out of which the building had been constructed, there to re-erect it. To insure the success of this venture, they associated with them five actors—Shakespeare, Heming, Phillips, Pope and Kempe—and organized "a sharing company, the first of its kind in the theatrical world." The new lease of the site for the Globe was so arranged that the two Burbage brothers acquired half of it, the five associated actors the other half, the total rental being £14, 10*s*. Shakespeare thus held originally a tenth interest in the Globe; and this continued up to 1610, when the five actors admitted Henry Condell to a share, reducing the share in the

whole of each of the now six owners of the actors' half to one-twelfth. In 1612 a further admission of William Osteler as a sharer reduced the share of each of the now seven actor-sharers of the Globe to one-fourteenth. The Burbages continued to own their half as before.

This was the Globe; but Shakespeare was also interested in another theater, that in Blackfriars. This house was also the property of the Burbages, and it had been leased to the Children of the Queen's Revels, who were suppressed as a company in 1608 by the order of King James. Immediately after, Richard Burbage leased the Blackfriars to a theatrical company of seven persons, for twenty-one years, retaining a seventh both for himself and his brother Cuthbert, and giving five others, among them Shakespeare, Heming and Condell, each a share like his own. The total rental was £40 a year. Thus in 1614 Shakespeare owned one-seventh of the Blackfriars and one-fourteenth of the Globe. The original cost of these shares was merely the rent of the ground and the obligations as to building and management. But the obligations were not inconsiderable. The original cost of the Globe in 1599 has been variously estimated at £600, or perhaps nearer the truth, £400—that would be $2,000; but we must multiply by at least five, more safely by eight, to represent approximately the then purchasing power of money. This would give, say, $10,000 or $15,000. Shakespeare's share was then one-tenth and his charge perhaps £40 or $1,000, $1,200 or more in present values. In 1614, after the destruction of the Globe by fire, the sharers rebuilt on the old foundation at a charge of £1,400. Shakespeare then owned one-fourteenth, and his share must have been £100, or at least $2,500 in present money values. Shakespeare's was the most successful theatrical company of its age—successful, we may well believe, because of the superlative excellence of Shakespeare's plays and the cordial recognition of that excellence by his contemporaries; and his shares in the venture must have become very valuable. But the statement in the legal complaint of Thomasina Osteler that the value of such a share as

Shakespeare's in each of these theaters was worth £300, that is, $10,000 or $12,000 in the purchasing value of today, is of course excessive, as such statements for claims of damages at law always are.

The unfortunate outcome of another inference from this complaint of Thomasina Osteler is the somewhat acrimonious discussion as to the site of the Globe in Southwark that ensued in the English papers on Professor Wallace's announcement of his discovery. The upshot of much talk, much argument and much prejudice is that a tablet has been erected in defiance of Professor Wallace's inferences. Your free Briton may not have made the discovery, but mere evidence at least cannot make him swallow it. The whole matter is a question, On which side of the street did the Globe Theater stand? It is not really very important, though it seems a pity that it could not have been amicably and definitely settled in accord with the ascertained facts.

VII. Another of Professor Wallace's discoveries discloses to us the precise place of Shakespeare's abode in London during some time within the period of his greatest activity, and adds a sixth to the slender total of his five signatures hitherto known. The suit, which was one for dower withheld, here lay between Christopher Mountjoy and Stephen Bellott, his son-in-law. The date is 1612, both parties tire or wig makers, French and Huguenots as to their faith. There are some twenty-six documents in the case, in nine of which Shakespeare is mentioned by name, while one of them is his deposition as a witness signed by his own hand. In these documents Shakespeare is described as "of Stratford-upon-Avon in the county of Warwickshire, gentleman," and his name occurs twenty-six times. The testimony discloses that Shakespeare has lodged with the Mountjoys from 1598, and that at her mother's request he had arranged the marriage between Mary Mountjoy and her father's apprentice, young Stephen Bellott, in 1604. On leaving their father's house the young couple had gone to lodge with one George Wilkins, a playwright of mediocre ability, whose dramas of

"Pericles" and "Timon of Athens" both were touched up by Shakespeare to such purpose that they appear in his collected works. An interesting picture of Shakespeare the man is here suggested to us, establishing for him a further claim to the charming and appropriate adjective that Jonson bestowed upon him—the gentle Shakespeare. It is the deposition of Joan Johnson, a servant of Mountjoy, that established Shakespeare's residence in the words: "One Mr. Shakespeare that lay (that is, lodged) there." The intimate knowledge of the parties and his friendly relations to them, as witnessed in his own signed deposition, raise the inference of Professor Wallace that Shakespeare lodged with Mountjoy during a series of years; but these things do not prove it. Certain it is that about 1604, and perhaps well prior to it—in other words, in the very period of the writing of "Hamlet"—Shakespeare lived with the Mountjoys at the corner of Silver and Monkwell Streets, in the parish of St. Olave, not far from Cripplegate. The property, now a public house plastered over with advertisements of a desirable brand of gin, is at present owned by the University of Oxford. As to Shakespeare in this case, he was a friendly and somewhat non-committal witness, as he seems to have been kindly disposed to both parties. Perhaps for this reason he was not further questioned. The whole matter was referred by the court to the decision of the French Protestant church in London and we know no more of it.

Shakespeare's new signature remains to us. It is scrawled like the others, and the second syllable is indicated by a dash, a thing quite customary then as now. Shakespeare's signature is as carelessly written as are many of our signatures today. He wrote decidedly better than Horace Greeley, and none of the signatures are illiterate, *pace hostibus*. The new signature is unmistakable and may be accepted as genuine beyond cavil.

There remain two other "new things," though these concern not Shakespeare personally, but books of his and the fate that befell them. In January, 1905, a copy of the quarto of "Titus Andronicus," 1594, was discovered in the town of Lund, in

Sweden. It had belonged to a gentleman named Robson, of Scottish descent, and had been brought to Sweden apparently by one of his ancestors. No copy of this quarto was previously known to exist, although the registration of the book disclosed that such an edition once had been. This quarto of "Titus Andronicus" was the earliest published quarto of a play assigned to the authorship of Shakespeare and as such has an additional interest. The book was purchased for $10,000 by a person indiscriminately described as "an American millionaire," and, to all intents and purposes, may now be described as lost once more. To those who wish the memory of Shakespeare relieved from the authorship of this able and atrocious tragedy, as I do, to whom moreover it is a matter of faith (in which heresy I am content to perish), that he wrote scarcely a line of it, this will not seem so great a loss.

Another bibliographical novelty concerns the strange fate of a copy of the first folio of Shakespeare's works sent up to Oxford just after its appearance in 1632, according to an arrangement that Sir Thomas Bodley, founder of the Bodleian Library, had made with the printers in London to supply this newly founded library with books. The Stationers' Company sent this book up to Oxford in sheets late in 1623 and the librarian sent them for binding to an Oxford binder in February, 1624. On its return the volume was chained to the shelf and still shows the marks of this old—and exceedingly prudent—custom. In 1654 the curators of the library sold this first folio on purchasing a copy of the third folio, which they regarded as the better, being the later edition. In 1906, 352 years after, this old first folio was purchased back from a Mr. W. G. Turbutt, of Ogsden Hall, Derbyshire, it having been shown, on investigation, that an ancestor of his had lawfully acquired it by purchase from an Oxford bookseller soon after its disposal by the curators. Such accidents as this should give one hope as to the strays of our own college libraries. Other such cases are not impossible.

Lastly, and it must be confessed, by all odds least, it is not so many years since that two alleged portraits of Shakespeare

turned up, not until then technically "described." Mr. John Corbin, who "described" them, called attention to the significance of a passage in the academic play entitled "The Return from Parnassus," in which a fashionable beau named Gullio, after quoting a passage from "Venus and Adonis," exclaims, "O sweet Mr. Shakespeare! I'll have his picture in my study at the court." This he believes points to the currency of prints of Shakespeare in his own day; and in this opinion no less an authority than Mr. Sidney Colvin, Keeper of Prints in the British Museum, concurs. (Some of you may recall Sir Toby's words to Sir Andrew Aguecheek as to his accomplishments: "Wherefore have these gifts a curtain before 'em? are they like to take dust, like Mistress Moll's picture?" This is an allusion to the portrait of the notorious Moll Frith, who dressed like a man, fought duels like a bravo and took purses on Hampstead Heath. Less redoubtable celebrities were also popularly represented in picture.) To return to our subject, the first of Mr. Corbin's "undescribed portraits" is painted in oil colors upon an elm panel and represents the head and shoulders of Shakespeare in proportions and in position precisely that of the well-known Droeshout print, which forms a part of the title page of the folio of 1623. In the upper left-hand corner the picture is inscribed "William Shakespeare, 1609." The picture is now in the Memorial Picture Gallery, London, and the whole question about it centers in whether it is a copy of the print of the folio, or the original picture from which that print was made. With authorities in art at variance over the subject the matter rests undecided. If the painting be the original of the print, at any rate Martin Droeshout could have had no hand in it, as he was born in April, 1601, and could have been no more than a youth of fourteen at the time of the death of Shakespeare.

The other portrait is known as the Ely Palace portrait, so called from its long possession by the Rev. Thomas Turton, Bishop of Ely, and its position in the collections of his episcopal house. This portrait is likewise in oils and painted on an oak panel. It represents a younger, thinner face than that of the

Droeshout picture, and the left side of the face is a little out of drawing, seeming to indicate a painting from life. The bishop acquired it in 1846 and its previous history is only a tradition, in substance, that it was obtained at "a sale of the effects of the last of a very old London family which had resided in Little Britain from before Shakespeare's time, that Shakespeare knew and visited the family and gave them this portrait." The picture has hung since 1864 in the Shakespeare house at Stratford, where it was long disregarded as of little possible value. The dusting and cleaning of it a few years ago disclosed an inscription almost effaced, because evidently made when the paint was still fresh, which expanded reads "[Anno] Aetatis 39, Christi 1603"; and it represents "a fair man with auburn hair, and eyes of brownish gray," clothed in a greenish-brown doublet, fastened by small buttons down the front, and with a plain white collar or ruff. Once more we are in no wise sure; but allowing for the stiffness and convention of the old art, that Shakespeare somewhat resembled these pictures we may well believe. It seems hardly necessary more than to mention a third picture, exploited June a year or two ago in the Llandudno *Advertiser* in North Wales. It is inscribed with the name of Jo[seph] Taylor, an actor who succeeded Burbage in the parts of "Hamlet" and "Othello," dying in 1653. It seems a copy of what is known as "the Jansen portrait of Shakespeare," itself regarded with suspicion.

And what, in summary, do these new discoveries come to, we may well ask? Perhaps no more than this: that Shakespeare came honestly by his raillery and humor from a father noted for his wit, and that when in debt, even without bond, he paid up like a man. That actors in Shakespeare's day are reported to have "outraged truth and decency" in their endeavors to attain respectability, and that Shakespeare poked fun at these endeavors, but was not above striving to procure a coat of arms for his father, so as to be born—so to speak, *ex post facto* a gentleman. Once more we learn that Shakespeare was handy with a pencil as well as with his pen. Then comes Professor Wallace

with his lawsuits in Shakespeare *vs.* Bacon, Osteler *vs.* Heming and Mountjoy *vs.* Bellott, and as a result we learn that Shakespeare owned more property than we had thought in London and defended his rights, and that he was described as "of Stratford-on-Avon, gentleman." Moreover, we now know the details of his "traffic with the stage" and just where he lived in London when he wrote "Hamlet," to say nothing of the new signature, the strayed books and the portraits alleged and plausible. Everything that we add to our knowledge of Shakespeare is natural and reasonable, expected and explainable. Indeed, we can explain everything about him save one thing—and that is his genius. However, when all is said, old Ben Jonson's is the best word as to Shakespeare on this as on so many other topics:

> This Figure, that thou here seest put,
> It was for gentle Shakespeare cut;
> Wherein the Graver had a strife
> With Nature to out-doo the life:
> O, could he but have drawne his wit
> As well in brasse, as he has hit
> His face, the Print would then surpasse
> All, that was ever writ in brasse.
> But, since he cannot, Reader, looke
> Not on his Picture, but his Booke.

THE BUSINESS MAN AND THE FEDERAL RESERVE ACT

By Thomas Conway, Jr.

Professor of Finance, University of Pennsylvania

It is exactly thirteen months ago today* since President Wilson, by his signature, placed the Federal Reserve Act upon the statute books of the nation. By the provisions of this Act, an Organization Committee was created, consisting of the Secretary of the Treasury, the Secretary of Agriculture, and the Comptroller of the Currency, whose duty it was to hold hearings and make investigations for the purpose of districting the country into not less than eight districts, or more than twelve, and to designate for each district a city which should be the seat of a Federal Reserve bank.

Immediately upon the signing of the Federal Reserve Act, this Committee organized and hearings were held in some eighteen cities. On April 2, 1914, the Committee announced its decision. It divided the country into twelve districts, specified the boundaries of each district, and designated the seat of each of the Federal Reserve banks. The New England States comprise one district, with a reserve bank at Boston. The State of New York constitutes the second district, with New York City as the seat of its bank. New Jersey, Delaware and Eastern Pennsylvania comprise the third district, with the Federal Reserve bank situated in this city. Three districts are created in the South, the centers being Richmond, Atlanta and Dallas. The Middle West is divided into four districts, with Reserve banks at Cleveland, St. Louis, Chicago and Minneapolis. The remaining two districts have for their designated centers, Kansas City and San Francisco.

While this work was under way, the Organization Committee was engaged in working out many of the preliminary problems incident to the inauguration of the system. A committee of

* This Lecture was delivered January 23, 1915.

experts was appointed, within a few days of the signing of the Act, with instructions to formulate tentative drafts of by-laws, systems of accounting and a form of departmental organization for the Federal Reserve banks. The Bureau of Engraving was set to work making designs for the new Federal Reserve notes. Each national bank, in compliance with the provisions of the law, was required to make its election as to whether it desired to enter the Federal Reserve system. All of them, with a few exceptions, signified their acceptance of the provisions of the Act, thereby becoming what are termed "member banks." The Organization Committee thereupon proceeded with the work of chartering the twelve Federal Reserve banks, as provided by the Reserve Act, and of supervising the election of those directors to be chosen by the member banks.

President Wilson, early last summer, forwarded to the Senate a list of nominations for the Federal Reserve Board, which, in reality, is a commission created by the Government for the purpose of regulating and supervising the operations of the reserve banks and of the member banks. Opposition developed to two of the President's nominations, in consequence of which the confirmation of the members of the Board—which was necessary to the actual organization of the system—was considerably delayed. While matters were in this state, the European War burst upon us. The financial situation suddenly became very grave; many new and serious problems demanded immediate attention. The national and state banks were subjected to heavy demands for cash; emergency currency, authorized under the Aldrich-Vreeland Act, had to be issued in large amounts, and a condition of great stress developed. This necessitated further delay and great caution in the inauguration of the Federal Reserve system, which involved the payment by the national banks of a portion of their subscriptions to the stock of the Federal Reserve banks, and, in addition, the payment of large amounts to the reserve banks by these national banks—or member banks—for reserve purposes.

Thus it happened that it was not until November 16th that

the twelve reserve banks were actually organized and opened for business; yet in view of the enormous amount of work which had to be done and of the extraordinary conditions, the work of organization was expeditiously and intelligently carried through.

The reserve banks have been in operation a little over two months. Some people, with little knowledge of the provisions of the Reserve Act, seem disappointed with the results thus far accomplished. They point to the fact that the reserve banks have not as yet enjoyed sufficient business to pay operating expenses; that some $287,000,000 of funds have been paid over to the new banks, whereas the rediscounts of commercial paper have been less than $10,000,000, and the total revenue producing investments of all classes are less than $35,000,000.

Such critics lose sight of the fact that by the provisions of the Federal Reserve Act, and because of the greater safety which the reserve banks promise to the country, the cash reserve of our member banks was reduced some $452,000,000 in amount, a large portion of which could be used to meet any additional demands. No account is taken, moreover, of the current depression in business and the consequent shrinkage in the volume of current financing.

It is not the intent of the Reserve Act that all or, in fact, a large part of the money paid over to the reserve banks should immediately be diverted into business channels. In fact, such a course of action would be most unfortunate, for it would lead to inflation, with all of its attendant ills.

We must not be discouraged if the Federal Reserve banks do not earn their dividends for the first two years, for we must bear in mind that three years are provided by the terms of the Act for the complete working out of the reserve system. That is to say, the work of shifting reserve funds is spread over a period of three years from the date that these banks are opened for business. Accordingly, the reserve banks will not reach their full stature until November, 1917. I think we may feel confident that before this date the business of the reserve banks will be sufficient

to pay expenses and the six per cent dividend upon the stock, provided for by this Act.

I have prefaced my discussion of the relation of the Federal Reserve banks to the business man by this brief explanation, in order to call to mind the reason for the apparent delay in the accomplishment of tangible results which can be seen and understood by everyone.

A critic of the Federal Reserve system has coined the phrase that the Federal Reserve banks are "kid glove banks," meaning that they do not meet the public hand to hand, but that their dealings with the public are indirect. In a sense, this is true. No business man, as the law stands today, can open an account with a Federal Reserve bank; he cannot make a deposit or have a check cashed by it; he cannot discount a note with it or sell his customer's notes to it, or in any other manner directly procure funds from it. He may deposit money with national banks, a portion of which will, in turn, be deposited with the reserve banks. The commercial paper, which he vainly tries to sell the Federal Reserve banks, may be gladly accepted from the member bank when the latter seeks to rediscount it with the Federal Reserve bank. In this respect, the Federal Reserve banks differ from the great central banks of Europe, all of which can deal—and habitually do deal—with the public at large. Whether this would be a desirable feature, we need not consider at this time.

The Federal Reserve banks are super-banks, or bankers' banks. Their depositors are exclusively banks and the United States Government. Their borrowers are banks. They are not intended as direct competitors of our existing banks, but as supplemental to them.

They are to be regulators, or governors, of our banking system, to check vicious tendencies; to protect individual banks and entire communities from runs by depositors, or the effects of sudden panics. They do not supplant that which we have had heretofore, but rather are complementary to it.

In view of the unusual functions of the Federal Reserve banks,

it might appear that their operations would have no effect upon the business community. Such a conclusion would be entirely erroneous. The shortcomings of our banking system have been generally recognized and deplored. Agitation to correct these abuses and defects has continued almost uninterruptedly for more than twenty years. The average man believes that the sufferers from these defects have been the banks; as a matter of fact, the real sufferer has been the business man. The well-conducted bank does not have to sacrifice its assets in times of panic and stress in order to meet its obligations. It is only the weak bank which is forced into liquidation. An examination of the net earnings and dividends of our banks will show that they have been little, if at all, affected by the great commercial crises of the last forty years.

The bank is a creditor; it can insist upon its claims being paid. The business man is a debtor, and in order to preserve his credit, he must meet his obligations, no matter what sacrifices this may involve. The bank may deplore the necessity which forces ruthless contraction of credits in times of stress. It may realize very keenly the extent to which a better banking system would obviate ruinous sacrifices on the part of its customers, but the loss, the heartache and the crushing consequences fall upon the business man.

It has been a standing indictment of American business that we have suffered at least twice as many panics as any nation of Europe, and that these panics generally have been started by a breakdown in our banking rather than in our commercial structure. During the lifetime of the present business generation, we have been afflicted with the panics of 1873, 1884, 1890, 1893 and 1907. The greatest service which the Federal Reserve system will afford to the business man will be to reduce the number of panics, and to minimize their effects.

Some enthusiasts have predicted that the Federal Reserve banks will entirely eliminate panics, and that we will know of them only as historical misfortunes from which we are now happily exempt. Such predictions are not supported by the

experience of other nations possessing improved banking systems. The Federal Reserve system should prevent one class of panic—that is, a bankers' panic due to the breakdown of our banking system. It will not prevent commercial panics. Of the great disturbances of the last fifty years, only a small portion have been commercial panics. To greatly reduce the number of panics which occur in a lifetime, and what is even more important, to provide the means by which the terrible devastation and loss, to both the reckless and the prudent, can be materially reduced—if the Federal Reserve system can accomplish this single purpose, it will have amply justified its existence.

A panic is a long time in the making, for the unhealthy conditions which bring it about are invariably of slow accumulation over a period of time. The panic itself is like an earthquake; it lasts but a few seconds. Its worst effects are found *not* in the terrifying crash of commercial houses, the failure of banks, and the melting away of security values, but in the long train of consequences which follow the upheaval. The closing of the avenues for new capital, through the inability to sell securities, the prostration of industry, the thousands of workmen without employment, the cessation of all construction work—whether of homes, public works or in the expansion of industrial capacity—are the most serious consequences. Years are required to readjust our delicate and complicated commercial and financial relations.

Thus it has happened that the history of the United States in our time has been a succession of periods of restless and feverish progress, alternating with periods of prostration and stagnation of equal or greater duration. The Federal Reserve system should do much to end this too frequent alternation of cycles of prosperity and depression.

The Federal Reserve banks, in the larger sense, are trustees of prosperity. It is their function to provide capital for legitimate business expansion, within very definite and wisely conceived limitations. It is not the function of the reserve banks to loan out all the money in their possession. They are store-houses of

reserve funds to be used in times of emergency, and in order that they may have a surplus in such times, they, like everyone, must husband their resources during normal periods.

A large part of their resources in normal periods (say fifty or sixty per cent) will consist of cash—more particularly of gold and gold certificates—which will serve the twofold purpose of providing additional money in times of stress, through the lending of surplus money on hand and of making possible the issue of Federal Reserve notes. Such notes must be secured by a gold reserve of at least forty per cent of the amount outstanding at any time, in addition to one hundred per cent of commercial paper, held for the same purpose.

The portion of the resources of the reserve banks which can be profitably employed will not be loaned directly to business men, but will be placed at their disposal, indirectly, as a result of the initiative of the member banks. Let us say, for example, that at some future period of great business activity in Philadelphia, the demand for money to finance current transactions exceeds the ability of the banks to extend credit to our merchants. Under such circumstances, the Philadelphia banks, if they believe that the demands for money can be prudently granted—both from the standpoint of the safety of the loan and the welfare of the city—can procure the additional money by taking from their portfolios certain classes of promissory notes given by business men, and after endorsing these notes with the bank's endorsement, rediscount them with the reserve bank. That is to say, the member bank sells or discounts the notes in turn, just as a merchant has previously done, the difference being that the member bank effects the discount at the Federal Reserve bank. In other words, if a business man needs money, he can discount with the member banks promissory notes, given him by his debtors, and thereby secure the necessary funds. The process of rediscounting with the Federal Reserve bank is exactly similar. The member bank, as it were, steps into the shoes of the business man, and when it needs money, follows exactly the same procedure, itself endorsing the

merchant's note and rediscounting the note with the Federal Reserve bank. By this process, the stored up funds of the country, lying idle in the vaults of the Federal Reserve banks, can gradually be put to work, as the volume of business expands and the money required to finance that business is increased.

A large part of our difficulty in the past has arisen from the fact that the surplus funds of the country, through the operation of the national banking system, had piled up in certain banks in the large cities, particularly in New York City; that the national banks in these large cities, having agreed to pay interest, usually at the rate of two per cent, upon the balances of their out-of-town correspondents, were forced to put such deposits immediately to work. Such deposits with the national banks in our large cities have often been termed "explosive deposits," because they are likely to be recalled when a panic or some other emergency arises.

Under these circumstances, the banks situated in the large centers, particularly the banks of New York City, holding these bankers' deposits, have been limited in the class of loans which they can make. They must keep constantly in mind the necessity of being able to return these deposits at any time, upon demand. Now, a manufacturer cannot borrow money upon demand to buy raw material, to pay wages, and to conduct his business, when the funds to repay the loan must arise out of the completion of the contract, the sale of the goods, and the expiration of the agreed-upon term of credit to his customer.

Therefore, the larger part of such bankers' deposits have gone into stock and bond collateral demand loans. It is generally admitted that a large proportion of these demand loans represent, directly or indirectly, speculative transactions. Thus for years we have had the anomalous situation of the accumulated reserves of our banks being used to foster security speculation. There is nothing inherently improper in financing stock exchange transactions. Criticism arises out of the disastrous effect which the diversion of this reserve money into such channels produces. Under the reserve system, when the

shifting of the reserves (which, we must remember, will take three years from the opening of these banks), is accomplished, the reserves of our banks will have been mobilized or concentrated in the hands of the twelve reserve banks. The reserve banks are forbidden to make collateral loans. In fact, every safeguard which could be suggested has been thrown around the operations of these banks, in order to prevent them from making loans upon collateral or loans the proceeds of which are to be used to finance the purchase or sale of stocks or bonds. The Reserve Act gives to the Federal Reserve Board the power to define the classes of commercial paper which may be purchased by the Federal Reserve banks, but it specifically provides (I quote from the Act) that "such definition shall not include notes, drafts or bills covering merely investments or issued or drawn for the purpose of carrying or trading in stocks, bonds or other investment securities, except bonds and notes of the Government of the United States."

A great advantage which the reserve banks will enjoy arises out of the fact that they will not pay interest upon the deposits of member banks. We will hear much criticism in the future, particularly from country bankers, against the provisions of the Reserve Act, when they must actually give up the two per cent interest which they have been accustomed to receive upon their balances with the national banks in the large cities. We must remember that the payment of interest upon bankers' balances is universally condemned by financial experts; that it is not practiced in any country in the world, except the United States, and that we can have no real banking reform until this practice is abolished. The payment of interest on such balances has necessitated the constant employment of the reserves of the country, and it has inevitably followed that the banking system breaks down whenever subjected to a severe strain. A reserve is something kept for a rainy day. If it is used every day, it is no real reserve.

Relieved of paying interest on bankers' balances, the Federal Reserve banks can follow the practice of the great central banks

of Europe. They can keep fifty to sixty per cent of their resources in the form of cash in their vaults, available to meet emergencies whenever such arise. They can follow the course of safety rather than the course of large profits, and, being relieved of the heavy, continuing, fixed charge of interest, while at the same time being limited as to the dividends which they can pay their stockholders, they will inevitably develop a sense of public responsibility, of stewardship for business and banking conditions, and this no single bank could have heretofore developed, in view of the large expenses and interest charges to which they have been subjected, and in view of the fact that they were active competitors with other institutions of equal size which looked only to the interests of their stockholders. The Federal Reserve banks have a ready-made clientele. They need not barter or traffic for their deposits. They can enforce discipline, rather than always seek to be obliging and be compelled to grant unreasonable concessions to their customers. In short, they can occupy the position which the Bank of England, the Bank of France and the Imperial Bank of Germany have occupied in their respective countries.

Without the necessity of forcing money into circulation, in order to meet heavy expenses during dull periods, the reserve banks will, to a large degree, avoid planting the seeds of future trouble through inflation of stock prices, and the encouragement of speculation. Their operations will tend to keep the business situation healthy, instead of developing fever in it, and thus the period of what might be called normal business development will be lengthened. It is doubtful whether the Federal Reserve banks can entirely prevent business speculation, the over-expansion of commercial credit, the over-extension of manufacturing plants, and the ballooning of stock, bond and real estate prices, which are the signs of an impending commercial collapse. It is believed, however, that the reserve banks can, with the passage of time, greatly diminish these tendencies and perhaps bring about a condition by which a recession to normal conditions may be gradual, and hence less destructive, as contrasted

with sudden and violent reactions as heretofore. We must remember, however, that the great banks of Europe have not always been able to prevent commercial excesses and resulting liquidation.

When the Federal Reserve Board and the directors of the several reserve banks, whose duty it is to keep constantly informed concerning business conditions, discern symptoms of over-expansion, they will adopt various measures to minimize or eradicate the unhealthy tendencies; and if this is found impossible, to prepare the reserve banks to render assistance when the crisis develops. The first sign of this policy will be a raise in the rate of rediscount.

At the present time when, because of conditions heretofore described, the supply of money is in excess of the demand, the rates of rediscount are down to a low level and the tendency which I am about to describe is not apparent because of the fact that the reserve banks are having difficulty in finding profitable employment for their money. The situation I have in mind is one in which there is great business activity. The demands upon the member banks are heavy and insistent. Under such circumstances, the requests for rediscounts on the reserve banks will be correspondingly large. When the reserve banks advance their rediscount rate, for example, from four to five per cent, for paper maturing in thirty days, with higher rates for paper of longer maturities, the member bank will find that it must either raise the rate of interest to commercial borrowers—which the experience of centuries shows will tend to discourage commercial borrowing—or handle such part of the business of its customers as is financed by rediscounts, at a smaller profit, or entirely without profit. If a bank lends money to its customers at six per cent, rediscounting the same note at four per cent, it has made a gross profit of two per cent, against which must be charged what might be termed an insurance item, covering losses through the purchase of bad paper and the clerical and overhead expenses incident to handling the account. If the rediscount rate is advanced to five per cent and the rate at which the

money is loaned to the borrower remains six per cent, the gross profit has been reduced from two to one per cent. If the rediscount rate is raised to six per cent, while the rate at which the borrower secures his money remains unchanged, there can be no profit in the transaction to the member bank.

The banks of Europe have been enabled, by advancing and lowering the discount rate, to control the demand for rediscounting and indirectly to put a check upon any further expansion of credit. An advance of the discount rate will mean tighter money and will tend towards a period of contraction which, after all, is the thing which the reserve bank desires to accomplish. Moreover, as commercial paper, previously rediscounted with a reserve bank, matures and is paid off, money will flow into the coffers of the reserve bank. The amount of cash in the hands of such institutions will increase, at the same time increasing the ability of the reserve bank to meet a sudden emergency, should it arise.

Some authorities have felt that one of the defects of the Federal Reserve Act is the inability of the reserve bank to *directly* control the amount of loanable money, which power has been found necessary in England and on the continent. The Bank of England has not always been able to force a contraction of loans or to check expansion through advancing its discount rate. Under such circumstances, the bank resorts to the very effective practice of going into the market and borrowing money from the joint-stock banks, as they are called, thus taking out of the market the extra supply of money, which is considered to be dangerous to the situation, and, incidentally, forcing the joint-stock banks to observe the policy desired by the Bank of England. Time will show whether our reserve banks will need such power. I think we all agree that the best course is to avoid resorting to such drastic measures, unless experience shall clearly demonstrate that they are necessary.

We come now to the third phase of the activities of the Federal Reserve bank. We have caught a glimpse of their operations in normal times and have endeavored to understand the main

outlines of their policy in times of over-expansion. The third phase of their activities concerns their policy in times of crises. In such periods, the reserve banks will, no doubt, follow, in general, the policy worked out by the central banks of Europe. The way to stop a panic is to lend money freely, not, as we have done in this country, to suspend cash payment. By having a large, *real* cash reserve, the Federal Reserve banks will be able to make extensive rediscounts for their member banks out of their cash in vault, and if this is insufficient to meet the needs of the situation, they will doubtless fall back upon the power to issue Federal Reserve Notes, thereby providing additional currency at a time when the tendency to hoard is great. Rediscounting will enable hard-pressed banks to reconvert their commercial paper into cash, thus putting them in a position to meet the demands of their depositors.

You have doubtless noticed the criticism made by a Philadelphia newspaper of the Federal Reserve Bank of Cleveland in not preventing the suspension of the First National Bank of Uniontown, Pa. We are not in possession of sufficient facts to pass judgment upon the criticism, but I think it is safe to say that the Federal Reserve Bank acted after careful consideration of all of the facts.

Mr. John Skelton Williams, Comptroller of the Currency, in his public statement of January 22d, relating to this matter, well explains the advantages which the Federal Reserve Act will confer in preventing the failure of properly managed banks:

"Under the old National Bank Act, a national bank with a capital of, say, $200,000, deposits of, say, $1,500,000, bills receivable amounting to $1,200,000, and $300,000 reserve, would be permitted to borrow a total of only $200,000, the amount of its capital. If a run should start on such a bank the amount which it could raise by loans, if strictly held to the old law, would be but $200,000, the amount of its capital, which might be quite inadequate to meet the run, and the bank, though thoroughly solvent, might be forced to suspend.

"Under the new law, however, if a bank with $200,000 capital and deposits of $1,500,000 should have loaned $1,200,000 to its customers on commercial paper and should encounter an unexpected run, in addition to borrowing $200,000, the amount of its capital, such a bank would have authority to rediscount with the Federal Reserve bank of which it is a member, notes, drafts and bills of exchange issued or drawn for agricultural, industrial or commercial purposes, having not more than 90 days to run, to any reasonable extent which may be approved by the Federal Reserve bank, to which application for such rediscounts may be made. In other words, if such a national bank as we have used in this illustration should have loaned the entire amount of its deposits, less the 15 per cent which it is required to keep as reserve, to its customers on acceptable commercial paper, and for any unexpected reason should be subjected to a run, the Federal Reserve bank of its district would have the authority to rediscount for the member bank the entire amount of its bills receivable, as represented by its commercial paper, thus enabling the bank to pay its depositors immediately and in full.

"We cannot overestimate the value of the additional security which this provision of the act confers upon every honestly, capably managed member bank, and the relief from strain and anxiety and from the fear and apprehension of panics and unreasoning runs which it gives to the officers of every member bank."

I need hardly point out, in passing, that a reduction in the number of bank failures will be of great assistance to the business man, both because of greater safety for his deposits and through the diminished likelihood of a disturbance of financial and industrial conditions by bank failures.

One of the great advantages urged for the reserve system is the fact that a disturbance in one district affects only that district, and that therefore the disturbance is more apt to be localized. Through the powers possessed by the Federal Reserve Board, a

method is provided by which all of the Federal Reserve banks can combine for mutual aid and assistance, and by which those free from trouble can safely go to the assistance of the districts in which a disturbance has arisen.

I have endeavored to picture, in a very general way, the operations of the Federal Reserve banks in so far as they will affect general business conditions. We have seen that these banks will hold a large amount of money, representing the reserves of national banks and such state banks as come into the system, which has been mobilized for the purpose of protection and assistance. A portion of this surplus cash will always be available through rediscounting operations. A large portion of it will be held for protection against panics and for dealing with such emergencies when they arise. As the activity of business increases, the volume of money in circulation will increase, and the ability of the member banks to finance their customers will be enlarged through rediscounting operations and the issue of Federal Reserve notes. This is the broad, general, constructive work which the reserve banks are planned to accomplish. In a sense, they are guardians of business safety, performing a service roughly similar to that rendered by the fire department of a city. Like the fire department, their advantages are indirect, for no one cares to think that he will have a fire. The contact of the ordinary business man with the reserve bank, in so far as these matters are concerned, is indirect.

There are two important aspects of the work of the Federal Reserve banks, the effect of which upon the business community, once they are developed, will be profound and obvious to everyone. The Federal Reserve Act imposes upon the Federal Reserve Board the duty of carefully restricting discounts by the Federal Reserve banks to notes, drafts and bills of exchange "arising out of actual commercial transactions, that is, notes, drafts and bills of exchange issued or drawn for agricultural, industrial or commercial purposes, or the proceeds of which have been used, or are to be used, for such purposes." It might appear at first hand easy to draft regulations which will accom-

plish this end, but the difficulties of the situation are apparent when I tell you that the Federal Reserve Board issued on November 10th last a regulation which was to become effective January 15th, which did not go nearly as far as many of the bank Clearing House Associations had recommended, but which has since been annulled. In response to the requests of the governors of the Federal Reserve banks, the Board, by its own motion, suspended the taking effect of this regulation until July 15th next, and then, only a few days ago, announced that the regulation in question was revoked and cancelled and will be replaced by a new regulation soon to be issued.

The difficulty which the Board encountered was the fact that, the relations between the banks and their customers being so far short of the ideal, to require the change imposed by the Board's regulation would work both confusion and hardship.

The suspended regulation provided, in substance, that no promissory note should be rediscounted unless the member bank had secured from the maker of the note, or the endorser who had discounted it, certain signed statements. Every note was to have stamped on it with a rubber stamp a form in which should be filled in the file number of the credit report in which the signed statement and other information was contained in the files of the member bank. The Federal Reserve banks were to have the power to call for the proper credit file and, as the Board remarks in its circular, "it may well be expected that the data thus gathered—particularly the files of more important firms and of those rediscounting in large amounts—will be so catalogued as to furnish the nucleus of an effective credit bureau, which, in turn, will eventually develop into a central credit bureau for the benefit of all the Federal Reserve banks of the system."

The practice of requiring financial statements from borrowers is not universal. Many banks have insisted upon it to a considerable extent. The man conducting a large business enterprise is accustomed to giving his statement. The difficulty

is that the farmer and the small tradesman do not understand the necessity for a statement or how one should be prepared. In short, the difficulty is the practical one of giving the member bank time to secure accurate information concerning the affairs of its borrowing customers.

Why has a bank the right to inquire concerning the business of its borrower? The answer is twofold. First, the ordinary promissory note carries no collateral; it has no special lien. Second, in bankruptcy, it shares as an unsecured claim on the same basis as the claim of the man who has sold goods to the unfortunate merchant. Carrying no collateral security and dependent for its payment upon the solvency of the borrower, and more particularly upon his ability, in the meantime, through the collection of current assets, generally of accounts due him by his customers, to gather together the required amount—it is important to inquire as to the net worth of the borrower and as to the relation which his current assets bear to his current liabilities.

The statements contemplated by the Federal Reserve Board are intended to give accurate information relative to this matter. The regulation recently withdrawn provided that the "required statements shall be signed under oath and shall contain a short general description of the character of the business, and shall, in addition, contain a balance sheet and a profit and loss account." The balance sheet, as you know, is a statement of assets and liabilities. The regulation requires that assets should be divided into permanent or fixed assets, slow assets, and quick assets. This sub-division is essential since commercial paper can be liquidated only out of quick assets, and it is important to know the amount of such assets. On the liability side, the borrower is required to separate his capital, his long-term loans, and his short-term loans. The Board enjoins the bank to see that the short-term loans should be in proper proportion to quick assets, and observes that the statement "should contain satisfactory evidence that the short-term paper is not being sold against permanent or slow investments."

The profit and loss account, as every business man knows, gives information as to the earnings of the borrowing concern. This requirement has been much objected to by many high-class borrowers on the ground that it was an unwarranted invasion of business secrets; and yet some information concerning this matter must be at hand, for successful businesses do not, as a rule, fail in a day, but are slowly eaten away by losses due to unprofitable operations.

A feature which may displease certain classes of borrowers is the requirement that the statement shall show the maximum aggregate amount up to which the concern supplying this paper expects to borrow on short credit or sale of its paper, and the concern giving the statement must obligate itself to obtain the member bank's consent before exceeding the agreed limit. In order that these requirements may become more than good maxims, honored by the breach rather than by their observance, the Board provided that the affixing of the stamp before referred to, giving the credit file number, should be considered a solemn and binding obligation of the member bank that the statement furnished by the borrower has been examined in accordance with the requirements of the law and the regulations imposed by the Board.

It is altogether likely that the new regulation, when issued, will call for much of the information set forth above. It is probable that some latitude will be given the member banks so that they will not have to have a credit file for every farmer who borrows money, but who does not keep books, and to whom the terms "profit and loss statement" and "balance sheet" convey no meaning. The important point for us is not necessarily what information is required of the farmer or of the small storekeeper or of the wholesaler or manufacturer, but of the effect which the Board's regulations, which will no doubt be progressively increased in scope as time goes on, will have upon the business community. Critics of our banking system have pointed out the fact that commercial loans in this country are made at higher rates of interest, both actually and relatively,

than in Europe. The rates of interest to business men will be reduced because an enormous amount of money, heretofore going into demand collateral loans, will be gradually shifted to commercial paper, because commercial paper is the most certainly available asset of a member bank, since it alone can be converted into money through discounting at the Federal Reserve bank.

But we will not have made the most of our improved banking system until we have closed the door upon the dishonest or reckless borrower. There is entirely too much money lost through investments in poor commercial paper. Credit reports will not prevent losses, but the general imposition of proper requirements will furnish information which will so decrease losses that a bank will not have to, unconsciously perhaps, include as a large part of its interest rate on loans, insurance against losses which may be incurred. The recompense to the careful, prudent, forehanded business man in the generally imposed requirement of commercial statements, will be that the repute of commercial paper will be raised, because his overventuresome competitor will find it harder to borrow money to finance price-cutting, trade wars, excessive expansion of business, or the many other foolish practices which are responsible for commercial failures.

A proper system of credit information will be one of the important and really valuable conservation measures of this generation. It is just as vital that we should conserve our capital as that we should conserve our forests, our coal areas, or our water power.

One great advantage which the Federal Reserve Act will bring about is the cheaper and more expeditious collection of checks and drafts drawn upon banks in distant parts of the country. The Federal Reserve Act requires Federal Reserve banks to clear checks and drafts deposited with them by member banks, and which have, in turn, been deposited with the member banks by their individual depositors. To be exact, not all checks received by member banks can be so handled, but only

such checks as are drawn upon a bank which is a member of some one of the twelve Federal Reserve banks. The work of inaugurating a satisfactory system of handling clearings through the Federal Reserve banks is a difficult and complicated matter which is now receiving the careful consideration of the Federal Reserve Board, of the Federal Advisory Council, and of the administrative officials of the twelve Federal Reserve banks. I have no doubt that it will be brilliantly handled. Collection charges for checks within any one of the Federal Reserve districts will disappear, while the charges to be made for the collection of checks upon far distant points will be radically reduced. How far these reductions will go, no one can foretell.

Perhaps the most illuminating contrast I can make for you, by way of suggesting the possibilities, is a comparison of the cost of collecting checks by the Boston Clearing House (which has for years performed a service nearly identical in method and character to that contemplated by the Reserve Act), with the cost of collecting out-of-town checks to the banks of New York. According to the official report furnished the Senate Committee, when the Reserve Act was under consideration, the Boston Clearing House collects local checks at an average of 2¼ mills for each thousand dollars collected, while the cost of collecting checks upon banks situated in any part of New England outside of Boston, averages about seven cents for each thousand dollars collected. Contrast these figures with the report furnished to the Pujo Committee by the New York Clearing House. According to this report, the average cost of collecting out-of-town checks, including those drawn on the so-called "discretionary points," was forty-two cents (42c.) per thousand dollars collected. When we consider that prominent bankers estimate that there are about $65,000,000,000 of so-called "foreign items," or checks drawn upon out-of-town banks, collected in a year, we can understand how much a saving of even one cent in the average cost of collecting each thousand dollars will mean. This saving will come about, not only through the reduction of exorbitant profits, which many banking critics have asserted

are made in the handling of this business, but also through the creation of better and cheaper methods of interchanging these items. We must remember that twenty-four cents out of forty-two cents, representing the average cost of collecting out-of-town checks by New York banks, consisted of exchange and collection charges paid by the New York banks to the interior banks. This, in many cases, represents compensation for merely writing out a draft upon a New York bank in payment of the aggregate amount of the checks forwarded, which draft, when received in New York, is charged against the balance of the interior bank upon the books of the New York institution.

We are all vitally interested in penny postage, or in lower telegraph or telephone charges, yet, strange as it may seem, the business community is largely ignorant of the fact that one of the greatest potential economies of the decade is promised by the Federal Reserve system, in lower cost and greater quickness. If the clearing and collection feature of the Federal Reserve Act can be quickly developed, along lines which would admit of the largest economy in cost and time, it will be the most powerful argument to bring the state banks into the system. It will solidify and tremendously strengthen the Federal Reserve system; it will remove any doubt as to the usefulness of the Federal Reserve banks, and make them secure against short-sighted and unnecessary attacks, prompted by disappointment through loss of profits heretofore enjoyed at the expense of business economy and business safety, or inspired by petty partisan politics.

Most of us feel that it is yet too early to echo Mr. Paul M. Warburg's statement that November 16th last, the day the Federal banks were opened for business, "may be considered as the Fourth of July in the economic life of the United States. Coming generations will commemorate it as marking the foundation of our financial emancipation. The new banking system, wisely administered, will prove to be the means, not of inflation, but of safety, independence and gradual healthy expansion." And yet Mr. Warburg has the universal respect of bankers in

this country, and is recognized as one of the leading authorities upon what might be termed big banking. He is not a man given to idle and extravagant statements.

The success of the system depends upon the degree of public co-operation and support which it receives; the skill with which the governors, directors and reserve agents of the several reserve banks manage their institutions; the wisdom, courage and foresight of the Federal Reserve Board, and the ability to keep the entire structure out of politics. We must not permit tinkering with the Reserve Act. If these conditions can be assured, I think there is no doubt that the greatest constructive financial legislation of the last fifty years has been the formulation and passage of the Federal Reserve Act.

SOME PUBLIC AND PRIVATE SOURCES OF INCOME IN ANCIENT ROME

By John C. Rolfe

Professor of the Latin Language and Literature, University of Pennsylvania

In the title of this lecture strong emphasis must be laid upon the word "some"; for the subject is far too large a one to be treated exhaustively within the limits of a single hour. Moreover, as in all other phases of Roman life, conditions varied greatly at different periods during the millennium and a half of the city's history. Our attention will be directed in the main to the early part of the Imperial period, the years covered by Suetonius's "Lives of the Caesars," from which I have drawn many of my illustrations.

In the early days of Rome both the income of the state and its expenditures were small. One considerable item in the budget of modern nations was always absent, for the system of national debts is of relatively recent origin. The nations of antiquity provided in advance for special emergencies involving a large expenditure of money, or met them when they arose by special taxes. Thus at the opening of the Peloponnesian war Athens had in her treasury a fund which had been accumulating since the Persian invasions, and Sparta is said to have been almost equally ready for the emergency.

The army was nevertheless a perpetual and growing item of expense. Although Rome's citizen-soldiers at first served without compensation, and furnished their own equipment besides, each of the *equites* or cavalry from the beginning received a horse from the state and an annual appropriation for its keep. Livy tells us that the latter was furnished from contributions made by orphans and unmarried women, to the end that all

the members of the community might bear their part in its defense.

At the time of the siege of Veii, when it became necessary for the army to keep the field for several seasons, the legionary soldiers began to receive an annual stipend, and at this time, too, we first hear of another class of *equites*, who furnished their own mounts, but were paid for their services like the infantry. Julius Caesar increased the pay of the legionaries to about twenty-two dollars a year,* and Domitian raised it to between fifty and sixty. An additional item of expense to the state was that the soldier no longer furnished his own equipment. The cavalry, until the time when they were recruited from foreign nations, and the officers, according to their rank, received higher pay. It has been calculated that in the Imperial period a legion of 6,000 soldiers cost approximately $250,000; so that Augustus's standing army of twenty-five legions required an annual outlay of some $10,000,000, including the cost of tents, artillery, transport ships and other necessary expenses. This is, of course, a trifle compared with the enormous cost of modern armies and their equipment, but it must be remembered that money was less abundant in those days and its purchasing power considerably greater.

During the civil wars the leaders sometimes raised and armed legions at their own expense. Caesar added in this way to the force which the senate had allowed him for his Gallic campaigns, in one case enrolling a legion composed entirely of transpadane Gauls, to each of whom, with his customary liberal views on the subject, he later gave full Roman citizenship. Not only did he furnish the equipment for such troops, but Suetonius seems to imply that this was his practice also in the case of his other legions; for he says that this astute commander provided his men with arms inlaid with silver and gold, not merely for show, but to make them the more reluctant to abandon them on the field of battle. Caesar, however, though liberal, was busi-

* Sums of money are given in dollars and cents. The figures are approximate and the difference in the purchasing power of money in ancient and in modern times should be taken into account.

nesslike, and after his victory he contrived to be reimbursed by the senate for these expenditures. Augustus used the inheritance left him by Julius Caesar in levying and maintaining the troops which gave him the control of the state.

The outlay chargeable to the army was increased by the gifts and donations which were expected on special occasions, by the prizes awarded for deeds of valor, and by the rewards paid to veterans on the completion of their terms of service. Gifts were looked for in connection with such events as the accession of an emperor or any joyful anniversary in the Imperial household. It was the failure of the frugal Galba to observe the former custom, and his remark that "it was his habit to levy soldiers, not buy them," which brought upon him the enmity of the troops in all parts of the empire; and when he adopted Piso without commemorating the event by a donation, he made it an easy matter for Otho to bring about his downfall.

The promise of a gift in advance sometimes secured, or made easier, the succession to the purple. Claudius was the first of the Caesars to resort to that means of securing the allegiance of the troops, and Domitian's first thought upon the death of his father is said to have been to promise the soldiers twice as much as his brother Titus had proposed to give them.

A second item of expense was the maintenance of the state religion, including the building and upkeep of temples, the purchase and preparation of victims for sacrifice, and the pay of certain of the officials; such, namely, as devoted their whole life to religious duties; for example, the flamens and the vestal virgins. The minor functionaries, too, the *pullarii*, *victimarii*, *haruspices* and the like, were paid for their services, but the *pontifices*, the augurs and others of that class received no compensation except the distinction of the office and the privileges which it conferred. The latter were neither inconsiderable nor unimportant. When Caesar left home to attend the election which made him pontifex maximus, he told his mother that he would not return unless successful, since failure meant financial and political ruin.

The higher officials of the state, the so-called curule magistrates, also received no pay, and were, besides, put to heavy expense, which became greater as time went on, for games and shows and the other obligations incurred by acceptance of the honor conferred upon them by their fellow-citizens; so much so that in later times it became difficult to find candidates for some of the posts.

In the Imperial period it is not always easy to determine which of the expenditures fell upon the emperor and which of them were carried by the state, while the problem is further complicated by the voluntary or more or less compulsory contributions of private citizens. With the division of the provinces into senatorial and imperial, of which only the latter required the presence of a large army, the military expense fell to the lot of the emperor, who also assumed a number of other financial burdens. This led to the establishment of the imperial fiscus, by the side of the old *aerarium* or treasury of the Roman people, commonly called from its location in the temple of Saturn, at the southwestern end of the Forum, the *aerarium Saturni*, or "treasury of Saturn." Augustus also established a military treasury, the *aerarium militare*, especially for the payment of the pensions due to veteran soldiers on their honorable discharge from active service. For this he set aside the sum of $8,500,000, and provided for its further needs by special taxes. Although the treasury of Saturn was always nominally in charge of the senate, as was the fiscus in its earlier days, both gradually came under control of the emperor, and in the time of Septimius Severus all distinction between the two was lost.

The emperors also had their private property, the *patrimonium Caesaris*, the income from which was derived from lands, mines, and the various industrial enterprises in which they invested their personal funds. Dio Cassius refers to the difficulty of distinguishing between the expenditures of the state and those of its rulers in these words: "Therefore I have no opinion to record as to whether a ruler at any particular

time took money from the public treasury or whether he ever gave it himself. For both these things were often done. Why should anyone list such things as either expenditures or donations, when the people and the emperor are constantly making both the one and the other in common?" Augustus stated in his will that he had spent nearly all his private fortune for the benefit of the state, including the estates left him by his natural father, Octavius, and his adoptive father, Julius Caesar, and hence could leave his heirs not more than seven and a half millions of dollars: a statement which throws some light on the original amount of his patrimony. In the account of the events of his reign, the well-known *Monumentum Ancyranum*, he records the fact that he four times made contributions to the public treasury from his own funds, but whether the reference is to the fiscus or to his private property is not certain, although the latter seems the more obvious inference. The same question attaches to the sum of $135,000,000* which Tiberius amassed during the twenty-three years of his reign, to be squandered by his mad successor in less than a twelve-month.

The income of the state was at first small and proportionate to its liabilities. It was derived to a large extent from the rents of the public land, consisting of territory acquired by conquest and set aside for the purpose. If the land in question was put under cultivation, the rent took the form of tithes (*decumae*), which were at first, as a rule, paid in produce. Those who rented the public lands for purposes of grazing paid a tax called *scriptura*, which derived its name from the registration of the number and kind of cattle, on which the amount of the tax paid by each owner was based. The state also possessed certain *loca publica* (shops, aqueducts and the like), the rent of which formed a source of revenue.

As time went on, and provinces were acquired, there was a growing tendency to throw the financial burdens upon them

* This sum is not only more impressive in its original form of 2,700,000,000 sesterces, but owing to the low monetary unit of the Romans (the sestertius was equal to about five cents) and the greater purchasing power of money, that form of notation gives a better measure of the fortune of Tiberius.

and to relieve Italy of almost all taxes. Sometimes a yearly tribute was imposed upon a conquered people. Thus Julius Caesar required of the Gauls an annual payment of $2,000,000, and he exacted money also from the Britons, although the amount is not stated. In other cases the tribute took the form of tithes, which were paid in some cases in produce and in others in money.

From an early period customs duties (*portoria*) were imposed upon certain imports, the usual rate being two and one-half per cent. The abolishing of these imposts, which is attributed to Valerius Publicola, must have been merely temporary, for we hear again of their remission in 60 B. C., so far as the ports of Italy were concerned. Julius Caesar once more imposed them upon foreign wares, and they continued in force for some time afterward. The *publicani*, or public servants, who collected this excise were no more popular than their successors of today, for we read constant complaints of their methods, especially of their habit of ransacking the baggage and searching the persons of travelers for dutiable articles. Certain commodities were subject to an export tax as well, and the Romans absolutely prohibited the removal from Italy of iron (wrought or unwrought), arms, oil, grain, salt or gold. Not only were duties levied at the frontier of the empire, but some provinces or groups of provinces were separated from one another by customs barriers. This form of taxation was not confined to the Romans, for Caesar found it in active use among the Gauls before they fell under the dominion of Rome.

As might be expected, smuggling was not unknown. Suetonius tells us, in the form of a legal question proposed for debate in the schools of rhetoric, that some slave-dealers, on landing in Brundisium, dressed a handsome and valuable young slave in the attire of a freeborn youth, with the purpose of evading the duty. They were successful in eluding the vigilance of the *portitores*, but on reaching Rome they were met by a claim for the slave's freedom, on the ground that his owners had voluntarily given him liberty. How the imaginary case

was decided is not recorded, but we may be sure that it was not an isolated one.

Rome was not blessed with an income tax in the ordinary sense of the term, nor was there, strictly speaking, one on property. Somewhat of the nature of both, however, was a special form of contribution, known as the *tributum*, demanded only in cases of necessity, which, however, since they usually arose from wars, were not infrequent. This was assessed on the basis of a citizen's property as rated by the censors, and was ordinarily one-tenth of one per cent, although in times of special stress the rate might be doubled or even trebled. It was not levied when there was no army in the field or when there was sufficient revenue from other sources, and it was sometimes repaid from the funds acquired as a war indemnity or from the sale of the spoils taken from the enemy. It is doubtful whether its repayment was ever guaranteed, thus making the *tributum* a public loan rather than a tax. On rare and memorable occasions it became necessary to resort to a *tributum temerarium;* that is, to call for contributions not amounting to a fixed percentage of a man's property, but demanding all that he could possibly give. The money required to ransom Rome from the Gauls in 387 B. C. is said to have been raised in that way.

As to the exact income of the state at different periods, we have little information. We are told by Plutarch that before Pompey's time it was $8,000,000, and that it was increased by Pompey to $13,000,000. While the state derived a regular income from various sources, as has been shown, there seems to have been a large amount of money or treasure in the *aerarium*, which was not invested in any way. Pliny, in his "Natural History," gives the sum deposited in the treasury at various times in terms of pounds of gold and silver, in addition to coined money.* When Caesar despoiled the *aerarium* of its contents during the civil war, Lucan describes what he found

* In the Consulship of Sextus Julius and Lucius Aurelius (157 B.C.), seven years before the third Punic war, the amount was 17,410 pounds of gold, 22,070 pounds of silver, and in coined money 6,135,400 sesterces.

there as follows: "The wealth of the Roman people, untouched for many years, which the Punic wars had given her, and Perses, and the booty from vanquished Philip. What Pyrrhus left behind in his hasty flight; the gold for which Fabricius did not sell thee to the king. What ye saved, manners of our frugal forefathers, what the rich peoples of Asia sent as tribute, what Minoan Crete gave to victorious Metellus and Cato brought over distant seas from Cyprus. The treasure of the Orient and the wealth of captive kings carried in Pompey's triumph. Then for the first time Rome was poorer than Caesar."*

The rich spoils which came to Rome as the result of the conquest of Macedon in 167 B. C.† made it possible to abolish the *tributum*, so far as Italy was concerned; for its ostensible revival in 43 by the members of the second triumvirate was rather of the nature of a *tributum temerarium*. Dio, it is true, regards this as a recrudescence of the ancient *tributum*, while admitting that it was conducted in an arbitrary fashion and not based upon the census. The *tributum* does not seem to have existed in Rome during the empire, but a similar tax was sometimes levied in the provinces.

A tax of five per cent on the value of all manumitted slaves was established in 357 B. C., according to Livy. The proceeds were assigned to the emergency fund known as the *aerarium sanctius*, and we are told that when it was drawn out, in the year 209 B. C., it amounted to 4,000 pounds of gold. Under the empire this tax formed a part of the revenues of the imperial fiscus, as did also an inheritance tax which Augustus revived. This had been devised at an earlier time, but had fallen into disuse, and Augustus pretended that the suggestion for its renewal came from papers left by Julius Caesar at his death. The rate was five per cent, but the tax was waived in the case of very near relatives or of small estates.

Besides the legitimate taxes, some of the emperors resorted

* He is said to have taken 15,000 ingots of gold, 30,000 of silver, and 30,000,000 sesterces (about $1,500,000).

† Estimated at $15,000,000.

to the most disreputable means of replenishing their exchequers when exhausted by extravagance and riotous living. Some of those employed by Caligula will not bear narration. Among other things, he is said to have sold off the furniture of the old palace of Augustus and Tiberius, when he built his new one, holding public auctions, at which he now railed at the avarice of the bidders in not being ashamed to be richer than their emperor, and now feigned regret for allowing common folk to acquire the property of princes. At these auctions it behooved one to keep wide awake, for when a luckless man happened to fall asleep at one of them, Caligula pointed him out to the auctioneer with the injunction not to overlook the gentleman who was nodding so frequently. When his nap was over, the man found to his consternation that he was the owner of thirteen gladiators that he did not want, and in debt to the extent of $450,000.

Another man, who had social aspirations, had paid $10,000 for the privilege of being an uninvited guest at one of Caligula's dinners. When the fraud was detected, the emperor was rather pleased than otherwise that the honor of dining with him had been valued so highly. But at his next auction he sent the man some trifle or other, with a bill of $10,000 and an invitation to dinner from the imperial hand.

Nero's efforts to improve his financial condition made it unsafe for anyone to make a will showing "ingratitude" towards his emperor—a very comprehensive term—while any act or word on which an informer could base a charge of lese majesty was sufficient ground for the condemnation of the unhappy victim and the confiscation of his property.

Dire necessity sometimes forced even the better emperors to resort to new and heavy taxes. Vespasian found the treasury so depleted by the mad extravagances of Nero and the following year of anarchy that he is said to have declared that it would require $2,000,000,000 to keep the state on its feet. Since the modern device of increasing the public debt was unknown, his efforts to cope with the situation earned him a reputation

for avarice of which he could never rid himself. As Vespasian in his earlier days had governed a province and returned "none the richer," while his father was celebrated in inscriptions of the cities of Asia as that *rara avis*, "an honest tax-gatherer," we may agree with his biographer in ascribing the emperor's frugality to necessity, especially as he is reported to have made the best possible use of his ill-gotten gains. As might be expected, some amusing tales are told of his love of money. At his funeral the actor who, according to the Roman custom, wore the mask of the deceased ruler and imitated his actions and words during life, asked one of the stewards how much the funeral was going to cost. On hearing the reply, "Five hundred thousand dollars," he cried: "Give me five thousand and you may throw me into the Tiber, if you like." Once upon a time when one of his attendants asked for a position at court for his brother, Vespasian put him off, in order to look into the matter. Finding that the alleged brother had agreed to pay a handsome sum for the appointment, Vespasian took the money himself and gave the man the position. When his attendant again brought up the matter, the emperor replied: "You'll have to look up another brother; the man you thought was your brother turned out to be mine."

Such stories, which are also told of Galba, are entertaining, but they may be discounted in view of the disfavor which naturally fell to the lot of an economical ruler from a populace spoiled by the lavish extravagance of princes like Nero and Caligula. That they themselves contributed largely to the payment for this prodigality did not lessen their dissatisfaction with a prudent régime.

A heavy item of expense to the state was the distribution of grain to the city populace at greatly reduced rates or even free of cost. The former practice began at an early period, although the first legal provision for such action was not made until 123 B. C., and by the time of Julius Caesar the number of those who participated in the liberality had risen to 320,000. Caesar reduced the number to 150,000 by excluding

those who were not lawfully entitled to the privilege. Augustus, after again revising the list and fixing the number at 200,000, seriously thought of doing away with the practice altogether, because of its bad effect on the beneficiaries, as well as on the pursuit of agriculture. He did not, however, consider such a course expedient, and his attempt to have the period of distribution made quarterly instead of monthly also failed. His biographer tells us that he did, however, regulate the custom with no less regard for the interests of the farmers and the grain dealers than for those of the city populace, but unfortunately he gives us no hint of how the miracle was wrought. The pernicious effect of this unwise liberality ought to be sufficient to convince us that the charity which furnishes men with employment is preferable to that which gives them something for nothing at the expense of their independence and self-respect. Vespasian had learned this lesson, it would seem, for he refused to make use of a labor-saving invention, although he gave the inventor a handsome reward, on the ground that he "must be allowed to feed his poor citizens."

The custom of free distribution made the charge of the grain supply (the *cura annonae*) a very important one. In the reign of Claudius the people did not hesitate in a time of scarcity to mob the emperor himself in the Forum and pelt him "with abuse and bits of bread," as Suetonius quaintly puts it. After making his escape with difficulty through a back door of his palace, Claudius took special pains to avoid a similar experience by building a harbor at Ostia and offering special privileges to the importers of grain as well as insurance against loss.

Another item which gradually assumed huge proportions was the cost of the games and shows, in part forming a portion of the religious expenses, but also given by the higher magistrates and by the emperor at their own cost. This tacit obligation on certain of the magistrates, in particular the aediles, gradually made it difficult to find men who were willing to become candidates for such costly honors. The great expense of the games, and what might be expected of an aedile as early

as 33 B. C., are shown by the following extract from Dio: "The next year Agrippa agreed to be made aedile and without taking anything from the public treasury, repaired all the public buildings and all the roads, cleaned out all the sewers and sailed through them under ground into the Tiber. . . In the many festivals which he gave . . . he also paid barbers, to the end that no one should be at any expense for their services. Finally he rained upon the heads of the people in the theater tickets that were good for money in one case, clothes in another, and something else in a third, and he would also place large stocks of goods in the squares and allow the people to scramble for them."

Public expenditures for educational purposes were relatively late. They began with the founding of public libraries, a project which was formed by Julius Caesar and carried out by his successor, Augustus. The honor of establishing the first institution of the kind, however, belongs to Asinius Pollio, who in 39 B. C. devoted to the purpose the spoils taken in his Illyrian campaigns. Later on, public libraries were presented also to the towns outside of Rome by the Carnegies of antiquity; for example, by the younger Pliny to his native town of Comum. The remains of such establishments have been found at Timgad in Africa, and at Ephesus, while one of the unidentified buildings at Pompeii was perhaps a public library. Besides the two libraries which Augustus built, on the Palatine and in the Colonnade of Octavia, Tiberius and Livia later founded one in connection with the temple of Augustus, while the fora of Vespasian and of Trajan also contained collections of books.

The first emperor to pay teachers from the public treasury was Vespasian, who, in spite of the tales told of his stinginess and cupidity, was a liberal patron also of artists and poets.

Charity to orphans and children of poor parents arose first in the form of the extension of the free distributions of grain, oil, and money to children. This was first done by Nerva, and under Trajan such distributions were made regularly every month. The children were called *pueri et puellae alimentarii*,

or from the emperor's family name, *Ulpiani*. Trajan's plans were extended by Hadrian and the Antonines, discontinued by Commodus and Pertinax, and renewed by Alexander Severus. Pliny founded a similar institution in his native town of Comum.

In this very brief and inadequate account of the expenses and income of the state some indirect light has been thrown on the opportunities for acquiring wealth which were open to private individuals. The common people of Rome were by no means so idle as is sometimes supposed, in spite of the demoralizing effect of the unwise liberality of the government and the competition of slave labor in the humbler trades, as well as in some employments which are today classed as professions. This statement, which might perhaps be questioned by those whose reading is confined to the authors called "classical," is abundantly supported by inscriptions from all parts of the Roman world, as well as by a more critical reading of the literary sources. The trades and guilds of workmen which are recorded in inscriptions surprise us not only by their number, but also by their high degree of specialization. Horace, in his *Ars Poetica*, illustrates his discourse by the example of a worker in bronze who could make parts of a statue with consummate skill, but not a complete human figure; and the list of specialists in female wearing apparel who present their bills to the unfortunate husband in Plautus's *Aulularia* does not seem an extravagant exaggeration when tested by the evidence of inscriptions.

Moreover, the attitude towards the trades and retail business was much less unfavorable than is sometimes thought. The feeling of Cicero, as expressed in the well-known passage of his *De Officiis*, does not differ essentially from that of an Englishman of today, or of those of our own countrymen who interpret the term "gentleman" in the British sense. To be "in trade" was looked down upon, he says, because in order to make a profit in retail business it was necessary to resort to deception and misrepresentation. In fact, false weights and measures and the various "tricks of the trade" were no rarer in antiquity than they are today, and one of the duties of the aediles, both

at Rome and in the towns of Italy, was to seize and destroy weights and measures which did not come up to the standard. The elder Pliny tells us that dealers in cloaks and underwear used to watch the rising of the Pleiades and raise their prices if the winter promised to be wet or long; not because their wares were really worth any more, but because the traffic would bear it. The oil sellers in the Velabrum had formed a trust as early as the days of Plautus, and the way in which he alludes to it shows that their purpose was no more philanthropic and altruistic than that of similar organizations today.

"Big business," too, was not free from reproach, but then, as now, it was safer to plunder on a large scale than on a small one. As a "gentleman" of today may water stock and wreck railroads, so Brutus could exact usurious interest from the Asiatic provinces without serious damage to his reputation, and Sallust, after enriching himself in Numidia at the expense of the provincials, lived a life of elegant leisure in his magnificent gardens and embellished his historical works with lofty moral sentiments. But business and commerce on a large scale were honorable and reputable, Cicero tells us, if one was content with moderate gains. The poets refer to commerce more frequently and in different terms than would be used if it were regarded as in any way discreditable, dwelling especially on its dangers and deprecating the avaricious spirit which could lead men to encounter the perils of the sea more often than was necessary.

Cicero agrees with Cato in regarding agriculture as the occupation most worthy of a freeman, and this pursuit, which had been the principal one in early days, had many followers under the empire, who frequently became very prosperous. At that time the farms in Italy were for the most part small, even the large estates being divided into numerous small holdings. The most profitable branches were the raising of poultry, vegetables and fruits, which found a ready market in the city, and especially the cultivation of vines, which, according to Columella, sometimes yielded a return of eighteen per cent on the investment. This latter industry was so profitable that it

interfered with the raising of grain, and Domitian issued an edict forbidding the planting of more vineyards in Italy and ordering that in the provinces all the vines should be cut down, or at most but half of them should be left standing. But this edict, like so many other attempts at rough-and-ready economics, was without effect and was soon repealed.

Equally honorable with the farmer's was the career of the soldier, but less desirable because more exposed to danger. The prizes, the money derived from a share in the booty, the pensions and other rewards for faithful service, made the life even of a common soldier by no means an unremunerative one in spite of the comparatively low pay. The men who served as officers, especially those who reached the rank of chief centurion, often became well to do and after retirement formed the aristocracy of the colonies to which they were assigned; for example, in Horace's native town of Venusia.

Some of the military prizes were of considerable intrinsic value, as appears from the statement of Suetonius, that Augustus was more ready to award objects in gold and silver than those which were more purely honorary. In this connection it is interesting to note that the Civic Crown, the most coveted of all such prizes, given for saving the life of a fellow-citizen in battle, was, like the English Victoria Cross, of no pecuniary value, being a chaplet of oak leaves. That the financial side of his profession was not lost sight of by some followers of Mars is shown by Horace's story of a soldier of Lucullus, who was robbed during his sleep of the savings of many hard campaigns. His rage at the loss inspired him to prodigies of valor, and at last for a deed of special daring he was given several honorary prizes and the more welcome recompense of a thousand dollars in cash. Shortly afterwards, when his commander urged him to lead a similar forlorn hope, he replied cynically: "Ask some one who has lost his purse." That the savings of a common soldier were not inconsiderable is shown by another edict of Domitian, forbidding the deposit of more than fifty dollars at the headquarters of a legion by any one soldier; and we are

told that it was the amount of such deposits with the commanders of two combined legions that led Antonius to undertake his revolution against that emperor. Among the papyri recently found in the Fayoum are the accounts of two soldiers with their commander, dating from about 180 A. D.

Indulgent and liberal generals, such as Julius Caesar, made their soldiers valuable presents from time to time, and Caesar was especially generous at the close of the civil war, when he is said to have given each of his veterans the sum of thirteen hundred dollars.

Horace, when he found himself without means at the end of his brief and inglorious campaign with Brutus, became a quaestor's clerk, and the lower branches of the civil service offered honorable employment to a great number of the commons, both in Italy and in the provinces.

We perhaps get a false idea of the idleness of the Roman populace from the fact that their working day was a comparatively short one, with ample provision for recreation and exercise. Few laborers devoted all their waking hours to money-getting, and holidays and festivals were numerous. Horace, in one of his "Epistles," has given us an interesting picture of the life of one of the humbler denizens of Rome, one Volteius Mena, who derived pleasure as well as profit from his humble calling, and knew how to play when play-time came. When the capricious liberality of a patron enticed him to a different kind of life and aroused in him the hope of becoming rich, he soon came to long for a return to his former condition of lowly independence.

The second class of citizens, the *equites*, or knights, engaged in the large commercial enterprises which were beyond the means of the commons, and from which the senatorial order was, nominally at least, excluded. The Roman taxes were collected by a system of farming; that is to say, the state sold the privilege of collecting them to the highest bidder, whether an individual or the representative of a syndicate, who often made a handsome profit for himself or his company from

the enterprise. This lucrative business was largely in the hands of the knights, who sometimes overbid in their eagerness to secure the coveted contracts. We read that Julius Caesar on one occasion relieved them of a part of their obligation, but warned them against bidding too extravagantly in the future. The system naturally offered a great temptation to extortion and the ill-repute of the *publicani*, or "publicans," was proverbial.

Under the empire the official career open to members of the equestrian order comprised the most lucrative posts in the service of the emperor, as well as some of great responsibility and power. It is not surprising, then, that we hear of knights who refused to enter the senatorial order when the opportunity offered, so that Claudius found it necessary to make a law that those who did not do so should also forfeit their rank as knights. The members of the order differed from one another in rank, and the higher class of procurators and the prefects formed a special grade, designated by the term *equestris nobilitas*.

The nobles, or senatorial order, were alone eligible for the old curule magistracies (which were without a salary) and were not supposed to engage in commerce or other business. That the law forbidding business activity was evaded is indicated by the passage of the Clodian law in 218 B. C., which provided that no senator should own a ship except of a certain limited tonnage, sufficient to enable him to transport to Rome the produce of his estates in the provinces. The general provisions of this law seem to have been extended to civil servants of a lower grade, but they were disregarded by the latter class and Domitian officially pardoned their transgressions. Even senators sometimes carried on business secretly through their freedmen or through friends of a lower rank than themselves. Indeed, necessity might even drive a noble to open violation of the law, and Vespasian, after returning from his province, took up the humble business of trading in stock to keep the wolf from the door, thereby earning the nickname of "the muleteer." This after he became emperor he exchanged for Cybiosactes,

or "dealer in salt fish," not because he took up that odoriferous trade, but because the Egyptians had applied the name to one of their kings on account of his stinginess.

There were others of the nobles who through pride or incapacity suffered a genteel poverty, in some cases to the extent of falling below the property qualification demanded of their order. These depended on the liberality of the emperor to enable them to retain their rank. Augustus showed himself very generous in this particular, but Tiberius, if we may trust Suetonius, pursued a different policy, and in some cases refused to continue the aid which his predecessor had given. The demands upon the purses of the nobles were heavy, both to keep up their position in a seemly manner and to meet the many demands on their liberality. As to the former point, Horace speaks with contempt of the praetor who was attended by only five slaves on a journey and carried his own wine-jar and cooking utensil; and Tiberius deprived a senator of the emblems of his rank, and presumably of the position itself, because he had moved out of his city house into his gardens just before the first of July (which was the day on which houses and rooms were commonly rented in Rome), in order to be able to rent a house at a lower figure after that date.

One means of adding to their resources which was open to senators was an appointment as governor of a province with the opportunities for "graft" and extortion which such a position offered. That such conduct was not exceptional is shown by the special mention accorded some of those who did not resort to it; and what was possible in that line is illustrated by Verres' career of rapine in Sicily.

While Caesar has escaped the infamy which attaches to so many provincial governors, it seems to have been rather because of his brilliant career than because his administration was beyond reproach. At any rate, his propraetorship in Spain marks the turning point in his finances. When he was on the point of setting out for that province, he narrowly escaped being detained by his importunate creditors, whose claims on

him are said to have amounted to no less than a million and a half of dollars. This enormous debt was in part due to his lavish expenditures for the entertainment of the people in his aedileship, but in part also to his extravagant habits. We are told that he had a newly built villa pulled down because it did not suit his fancy in every particular, and that he bought slaves at prices of which he himself was so ashamed that he forbade their entry in his accounts. He was besides an enthusiastic collector of statuary, bronzes and other works of art. He succeeded in putting off his creditors because Marcus Crassus guaranteed the payment of his obligations, and after that time we hear nothing more about his insolvency. On the contrary, we are told that at the close of his Gallic campaigns he had more gold than he knew what to do with, and offered it for sale in Italy and the provinces at one-half the usual rates. As to the manner in which he acquired his wealth, Suetonius tells us that he borrowed money from the provincials to help pay his debts, and that he sacked and pillaged certain towns of the Lusitanians, although they opened their gates to him and accepted his terms of surrender. In Gaul, according to the same authority, he robbed temples and shrines and made war more frequently for the sake of plunder than of conquest, while he supported the expenses of the civil wars by the most barefaced pillage and sacrilege. Making due allowance for the probability that Suetonius gathered a good deal that was slanderous and false from sources hostile to Caesar, there seems to be no possible doubt that he returned from Spain considerably richer than before, and that his campaigns in Gaul were not wholly unprofitable from a pecuniary standpoint.

It seems probable that the condition of the provincials improved somewhat under the empire, although the prosecutions for extortion mentioned so frequently in Pliny's "Letters" and other literature of the period show that the vice was not extinct. Tiberius, in spite of the tales which are told of his greed and tyranny, set his face against the wholesale plundering of the provinces, replying to his procurators, when they urged

him to increase the taxes, that "it was the part of a good shepherd to shear his flock, not skin it." On the other hand, Vespasian, whose incorruptible administration of Africa has been mentioned (although Tacitus does not agree with Suetonius on this point), is said to have practiced extortion indirectly when emperor, by advancing the most rapacious of his procurators to higher positions, that they might be all the richer when he finally condemned them and seized their goods. As his biographer puts it, he made sponges of them, "soaking them when they were dry and squeezing them when they were wet." In this case the condemnation of the oppressors, although profitable to the emperor, would not seem to have benefited the victims of their rapacity. That the same was often true when such offenders were punished by due process of law, is shown by Juvenal's lines describing an ex-governor as reveling in exile and enjoying his ill-gotten gains, while the province, victor in his suit, bewails its losses, which were by no means made good by the nominal fine imposed upon its former ruler.

It is, of course, conceivable that in some cases it might be possible to enrich oneself honorably in a province by profitable investments or in other legitimate ways, but we have little or no information on this point, and to return richer from the governing of a province seems to have been regarded as *prima facie* evidence of maladministration.

A more reputable means of acquiring wealth which was open to members of the senatorial order was the defending of wealthy clients in suits at law. The Cincian law of 207 B. C. had indeed forbidden the acceptance of fees for such services, but the fact that Augustus found it necessary to renew the law in 17 B. C. shows that it had virtually become a dead letter. Tacitus tells us that the emperor Claudius limited fees to five hundred dollars, and that Nero, at the beginning of his reign, abolished them altogether. Suetonius, however, informs us that Nero later provided that clients should pay "a fixed and reasonable fee" (its amount is not stated), but without the addition of costs, which were assumed by the state.

Even when fees were nominally illegal, grateful clients could show their appreciation of the services of their advocates by gifts, although the law forbade that also, and perhaps with less risk by legacies. Among the Romans bequests were frequently left to prominent men even by those who were under no obligation to them, and not seldom by some who had no claim to the title of friend of the beneficiary, if they were not complete strangers to him. This is indicated, in addition to numerous other references, by Pliny's remark to Tacitus in one of his "Letters": "You must have noticed," he says, "that we receive the same legacies and in common, unless haply some one chances to be a particularly intimate friend of one or the other of us." Such posthumous remembrances formed an important item in the budget of men of eminence in various lines. Cicero tells us that he had received about a million dollars in bequests, while Augustus acknowledged the enormous sum of seventy millions from the legacies of friends. Such remembrances were frequently accompanied with complimentary words, and Suetonius tells us that Augustus appreciated these even more than the money, and was chagrined at their omission. On the other hand, it sometimes happened that a last will and testament was made the vehicle of unfavorable opinions, which the deceased had silently treasured during his lifetime. So common was this that during the reign of Augustus a law was proposed checking this form of freedom of speech, but the emperor vetoed it. Among those who resorted to this safe way of expressing their feelings was Petronius, the author of our first romance in the Latin language, who inserted in his will a bitter satire on Nero.

It is obvious that the custom of leaving legacies to men of prominence offered temptations to the unscrupulous emperors to use it as a means of increasing their revenues. Augustus alone would never accept an inheritance from a stranger, and whenever one was left him by a friend or acquaintance who had children, always restored it to the legal heirs at once, or when they came of age. Naturally the custom encouraged

"legacy-hunting" on the part of private citizens also, and this became so common that the literature of the period abounds in references to it. In the familiar fifth Satire of Horace's second book the seer Teiresias gives Ulysses specific directions for the successful pursuit of the "art," and in one of the letters of Pliny there is an amusing account of the machinations of Regulus in this line.. Forgery was not unknown, and in the reign of Nero it was guarded against by requiring a special form of tablet for wills, while one who wrote a will for another was forbidden to include in it a bequest for himself.

Senators were, like the knights, eligible to some highly paid posts in the army and in the civil service, in addition to the gratuitous curule offices, and the senatorial governors of provinces under the empire received salaries, in some cases amounting to as much as $5,000.

Gifts were made to the emperors on special occasions such as New Year's day, in fulfilment of vows undertaken for their recovery from illness, and for various other reasons. And when disasters overtook them, such as fire in the imperial palace, contributions flowed in from all classes of citizens. This last was also true of private citizens of wealth and prominence, as we may infer from Juvenal's lines describing the different lot of the poor man and of the rich man at such a time. The poet implies that, as sometimes happens today, such fires were not always purely accidental.

No such hard and fast line was drawn by the Romans between trades and professions as exists today. The term *ars*, or "art," is applied alike to the business of the orator and the physician and to that of the fuller and the cook. The healing art was largely in the hands of slaves and freedmen. Such physicians as were of free birth were for the most part foreigners, and Julius Caesar conferred Roman citizenship on all those who practiced the profession at Rome, together with all teachers of the liberal arts, to make them more contented with their residence in the city and to induce others to resort to it. That the profession might be considered remunerative, at least for those

days, is shown by the elder Pliny's statement that Quintus Stertinius considered it a favor to accept a salary of $12,000 a year as court physician to Claudius, since he could make $15,000 by private practice, and that he and his brother left an estate of over a million dollars, in spite of the fact that they had spent large sums in the adornment of their native city of Naples.

The emoluments of teachers were at first small, and owing to the absence of copyright the profits of literary men were precarious and uncertain. The latter depended to a great extent upon the liberality of wealthy patrons, of whom Maecenas is typical and has become proverbial. It was to this source that the great writers among the Romans for the most part owed the opportunity of devoting themselves to literary pursuits, except in so far as they were also men of affairs, like Caesar and Cicero, for example. The unenviable position of those who through lack of ability or some other cause were unable to secure a patron is sketched by Martial in lines addressed to one who hoped to make a living by writings equal to those of Ovid and Vergil. "You are crazy," says the epigrammatist; "all those men whom you see yonder in chilly cloaks are Nasos and Vergils."

On the other hand, success in this line of endeavor might prove a means of livelihood and even of comfort. Horace admits that it was narrow circumstances which drove him to the writing of verses, and the story of his life shows what such a career might bring to a man without loss of independence or self-respect. For in one of his "Epistles" Horace defines his relations with Maecenas with admirable dignity and firmness, and he had the courage to risk offending the emperor by declining to accept the post of secretary to Augustus. To the latter's credit be it said, that he thought none the worse of the poet because of his manly independence, but makes jocose allusion to it in one of the numerous letters of his which Suetonius has preserved for us.

The teachers whose long hours and scanty pay are referred to

by the satirists were those in the elementary schools. The higher walks of the profession offered at least a modest income and sometimes comparative wealth. Juvenal speaks in particular of the large incomes of fashionable teachers of music, which, he says, would make a rhetorician tear up his text-books. While Suetonius's work "On Grammarians" makes it evident that many entered the field from necessity, he speaks of their compensation as "great" at a comparatively early period; and while some teachers, for example the "flogging Orbilius" immortalized by Horace, taught like some of their successors of today, "with more renown than profit," Verrius Flaccus received a salary of five thousand dollars, which is considered a respectable one today, as tutor to the grandsons of Augustus. The same sum was given the first teachers paid from the funds of the state, in the reign of Vespasian.

Evidently the fortune of teachers was affected to some extent by their personal tastes and habits. The notorious Remmius Palaemon, whose high opinion of his own abilities was equaled by his ill-repute, is said to have received twenty thousand dollars a year from his school and as much more from his private property, but yet to have found it impossible to live within his income. He was a shrewd manager, as well as an able scholar, owning shops for the sale of ready-made clothing and showing great skill as a husbandman, especially in the cultivation of vines.

Some sources of income were looked down upon. Horace refers somewhat scornfully to those who undertake public contracts, while Juvenal, under the same general head, mentions in particular the cleaning out of the sewers, the work of the undertaker, and slave dealing. But there were also employments which the Romans regarded as of ill-repute, to which no stigma attaches at the present time. Cicero, in the passage from the *De Officiis*, to which reference has already been made, puts first in the list of undesirable employments "such as incur the hatred of mankind, as those of customs officers and money-lenders." Apparently the Romans did not make any marked

distinction between the money-lender on a small scale and the bankers who did a larger business; for Suetonius tells us that Augustus degraded certain knights because they borrowed money at a low rate of interest, to invest it at a higher percentage, the principle which lies at the root of modern banking. Their ill-repute was doubtless due to the unscrupulousness of some members of the guild, who exacted enormous rates of interest, in the provinces sometimes as high as forty-eight per cent. The money-lenders also incurred discredit by making loans to extravagant and impoverished young men, and Vespasian made a law that those who lent money to minors should have no recourse in the courts, even after the death of the fathers. Sometimes, too, they lent money to towns in the provinces, and after thus getting them into their power, treated them in a barbarous fashion. There were doubtless many who conducted this necessary and important business in a legitimate and honest manner, but, as is so often the case, the reputation of the whole industry suffered from the dishonesty of some of its followers.

Another profession which is today a reputable one was considered unworthy a citizen of Rome, namely that of the actor. Under the empire we often hear of senators and knights who appeared in the arena and on the stage, but the frequent laws against this show how such conduct was regarded. Tiberius punished with exile those who voluntarily gave up their rank in order to avoid the consequences of violation of the law. Among the emperors, Caligula and Nero so far forgot their dignity as to appear in public for the entertainment of the people. This must have been so shocking to Romans of the old school, that when Juvenal speaks with as much horror of Nero's appearance on the stage as of the murder of his mother, we are not justified in treating the poet's utterances as entirely a rhetorical exaggeration.

Besides these, there were the means of making money which have been condemned in all ages, such as blackmail and various forms of "graft." The former most frequently took the form

of false accusation. To this the governors of provinces, whether innocent or guilty, were always liable, and Julius Caesar so intimidated Lucullus by a mere threat of prosecution that Lucullus fell at his feet in terror. Since the accuser received a part of the fine, the evil, with its train of professional informers, became almost, if not quite, as common as legacy-hunting, and it receives equal attention from the satirists. Horace speaks of the informers of his day, who walked the streets, note-book in hand and hoarse from their frequent accusations, a terror to malefactors. But under the emperors, especially whose who were of a timid or suspicious nature, or who stooped to filling their treasuries by illicit means, the danger spread to those who were guilty of nothing worse than lese majesty at the most, if their sole offense was not the possession of wealth.

That insult to the reigning prince might be a venial offense, and that it was difficult to avoid it, is shown by Suetonius's catalogue of the acts which were regarded as capital crimes under Tiberius: to beat a slave near the emperor's statue or to change one's clothes there; to carry a ring or a coin stamped with his image into an unseemly place; to criticise any action or word of his. A writer of history was condemned to death for calling Brutus and Cassius the last of the Romans, while a poet suffered the same fate on the charge of having slandered Agamemnon in a tragedy. Again making due allowance for exaggeration, there seems to be no question that lese majesty was an offense very easy to commit.

Nero reduced the rewards paid to informers to one-fourth of the former amount (whether in his own interest or to discourage the practice is not certain), and Titus and Domitian took severe measures of a more practical kind to suppress the evil. It nevertheless flourished during the latter emperor's reign.

Some men made a profit out of their influence at court, like the future Emperor Otho, who received a large sum of money for securing the pardon of an ex-consul who had been exiled for extortion, while the sum of fifty thousand dollars, which he had been paid by one of the emperor Galba's slaves for getting him

a stewardship, is said to have been his entire capital when he embarked upon the revolution which made him ruler of the world for ninety-five days. Vespasian, in the days of his poverty, after his return from Africa, is said to have extorted ten thousand dollars from a young man for whom he secured the broad purple stripe of senatorial rank, and the virtuous Titus is accused of putting a price on his influence in cases which came before his father's tribunal. Before Vitellius became emperor, he was beset by a throng of creditors as he was on the point of setting out for the province of which he had been appointed governor, including the representatives of two towns whose public funds he had embezzled. But he alleged that one of the more importunate of his creditors had kicked him, and so far from paying his debt, extorted twenty-five hundred dollars from the luckless man.

Still more degrading ways of making money are attributed to the earlier days of Julius Caesar, Augustus and Domitian, but in the cases of the first two at least they are in all probability slanders, due to the calumnies which were industriously circulated by their enemies and detractors.

From this brief account of some of the sources of income under the Roman Empire, it is evident that while conditions in the ancient world differed materially in many respects from those which prevail today, human nature is much the same. There are honest men and dishonest men, and the practices of the latter sometimes bring into disrepute employments which are otherwise honorable and reputable. The prosperity and stability of the empire for so many centuries show that the greater number of the people were honest and industrious, and the greater part of the officials competent and trustworthy. The conspicuous exceptions are pilloried in our extant literature, while the majority have been forgotten and are unknown except for chance allusions or the less familiar testimony of inscriptions. But we cannot afford to neglect the lessons of the past, whether they offer us examples to follow or to avoid.

THE PEOPLING OF THE ENGLISH COLONIES IN AMERICA

By Herman V. Ames, Professor of American Constitutional History and Dean of the Graduate School, University of Pennsylvania.

Let England know our willingness
For that our work is goode
We hope to plant a nation
Where none before hath stood.

These lines, from "Newes from Virginia," a pamphlet published in 1610, containing a narrative in rhyme of the latest experiences in the colony by one of the adventurers, give expression to the thought I wish to present this afternoon, namely, the planting of a new nation.

In the discussion of this subject, owing to limitations of time, I shall leave out of consideration or only touch upon in passing some of the more familiar facts, in order that more attention may be given to others possibly not as well known.

I invite your attention first to the causes and motives which originally prompted English participation in American colonization; subsequently to a review of the several movements which led to the peopling of the colonies, and finally to an analysis of the various elements that made up their population.

Although England laid claim to the new world by virtue of the discovery of John Cabot (1497), she made little systematic effort to consummate her claim by exploration and actual settlement until the reigns of Queen Elizabeth and James I. The explanation of her failure to follow up this advantage is due in large part to the fact that England, for nearly a century, was so occupied with internal difficulties consequent upon the introduction of the Reformation, that she was not in a position to turn her attention to colonization. The failure of the

English to emulate the deeds of the Spanish and Portuguese called forth expressions of regret and chagrin by contemporary English writers in the first English books in regard to the new world. They were urgent in their demands that England should secure possession of that part of North America not already occupied and which was nearest to her. With the coming, however, of Queen Elizabeth to the throne, the situation underwent a change. The English sea rovers showed renewed activity and extended their voyages to distant parts, not only adding to the geographical knowledge of the age, as by the voyages of Frobisher in search of the northwest passage and that of Drake in circumnavigating the globe, but also by those of Hawkins, Drake and others in their attacks upon the Spanish treasure ships and the Spanish colonies. To Spain's protests against these acts the English government replied, in 1580, "that they could not acknowledge the Spanish right to all the country, either by donation from the Pope or from their having touched here and there upon the coast; that this by the law of nations could not hinder other princes from freely navigating those seas and transporting colonies to those parts where the Spaniards do not inhabit; that prescription without possession availed nothing."

The exploits of the Elizabethan seamen fired the pride and stirred the imagination of their countrymen. Thus Sir George Peckham, in 1583, sought to awaken his countrymen "out of that drowsie dreame wherein we have so long slumbered," by urging them to challenge Spanish monopoly of the riches of America. From this time onward Englishmen's interest in colonization was aroused, and the expeditions of Gilbert and Raleigh followed and furnished much in the way of practical experience. But the danger threatening England in the attack of the Spanish Armada, in 1588, prevented the relief of Raleigh's colony, and it met an unknown fate.

With the destruction of the Spanish Armada, England was relieved from immediate dangers from abroad and her internal affairs were so adjusted as to permit Englishmen to turn their

attention to the extension of their commerce and to plans of colonization in America.

It is of interest to note that at about the same time, France, which for half a century had been torn by civil and religious strife, with the accession of Henry of Navarre as Henry IV, in 1594, and the issuing of the Edict of Nantes, in 1598, was now at peace, and Frenchmen were likewise in a position to give their thoughts to plans for a colonial empire in America. Brave little Holland had practically won her independence and also was preparing at the opening of the seventeenth century to enter into competition with the other nations for a share in the land and trade of the western as well as the eastern world.

It is of great significance that just at the time when these three powers were about to take up the work of colonization, that there was a cessation of Spanish activity in America. Her possessions there had reached their greatest geographical extent. Her power, however, gradually suffered decline, and she offered little successful resistance to the colonization by other European nations of the country north of the Gulf of Mexico, which she had failed to occupy.

At the opening of the seventeenth century, however, England, France and Holland, each destined to play an important part in the development of the New World, were without a foothold on the western continent.

The early English expeditions had proved a failure largely because they were left to the initiative and support of one individual, or, at best, a few individuals. It was beginning to be realized that if England hoped to successfully compete with her rivals, colonization must be undertaken either by the government or by commercial corporations. As the writer of an early seventeenth century paper, entitled "Reasons for the Raising of a Publique Stocke" declared, "Private purces are cowlde comfortes to adventurers, and have ben fownde fatall to all interprises hitherto undertaken by the English by reason of delaies, jeloces and unwillingness to backe that project which succeeded not at the first attempt," and he urged that "it is

honorable for a State rather to backe an exploite by a publique consent than by a private monopoly." But the government apparently was both unable and unwilling to assume the financial burden. The marked success, however, of the several English trading companies to different parts of the Eastern Hemisphere naturally suggested their employment in the Western Hemisphere. This resulted in the incorporation of the London and Plymouth Companies for Virginia, in 1606. The connection between the East India Company and the London Virginia Company is significant as showing how the formation of the latter company was an outgrowth of the former. Sir Thomas Smyth was the head of each, and fully a hundred stockholders were common to both companies. Through the enterprise of the London Company, it achieved the distinction of founding the first permanent English colony in the New World, and made possible the possession of North America by the English nation.

What were the motives advanced by English writers during the closing years of the sixteenth century and the opening years of the seventeenth century, for promoting the colonization of America? Several American scholars in recent years, notably Drs. Beer, Bruce and Alexander Brown, have published careful and extended works which have contributed much new material to the answer of this inquiry. To those desiring to pursue this subject further I would commend their writings. At this time, however, I venture to present some of the results of my own examination of the contemporary literature of colonization. For this purpose I have drawn from several pamphlets and papers written chiefly between 1582 and 1624. The various motives therein presented may be grouped, for convenience, under the three following heads: First, patriotic; second, religious; and third, commercial and economic.

Although not necessarily the strongest, let us consider first the patriotic reasons urged for colonization, namely, that of advancing the fame and power of England. This motive was generally recognized from the first, but it was concretely

expressed by Sir Ferdinando Gorges, in 1638, when he urged the expediency of "supportinge foreigne plantacons," on the ground that "nothinge adds more glorie and greatnesse to anie nation than the enlargement of theire Territories and the multiplyinge of theire subjects."

But there were also especial reasons brought forward for activity in America on the ground that colonies would prove to be an effective means of weakening their inveterate enemy, Spain. Thus in "A Discourse on Western Planting," written by Richard Hakluyt, in 1584, at the request of Sir Walter Raleigh, to be placed before the queen, was a chapter on "How Spain May Be Abased." If we remember that this was four years before the attack of the Spanish Armada, we will realize the importance of this question. Hakluyt pointed out the desirability of attacking the Spanish King first in the West Indies. "If you touch him in the Indies," he writes, "you touch the apple of his eye; for take away his treasure, which is *nervus belli*, and which he hath almoste oute of his West Indies, his olde bande of soldiers will soon be dissolved, his purposes defeated, his power and strength diminished, his pride abated and his tyrannie utterly suppressed." Some years subsequent to the founding of Virginia, Governor Dale, of that colony, declared that Virginia had put "a byt in our anchent enymye's mouth, that will curb his hautynes of monarchie." The continued danger from the Spanish is pointed out in a pamphlet issued as late as the middle of the seventeenth century, entitled "Virginia, Richly and Truly Valued." In this the support of the Virginia settlements is urged "to prevent the Spaniard, who already hath seated himself in the North of Florida, from securing more territory in North America."

Not only was colonization urged as a check upon the Spanish power, but it was also advocated against the colonial schemes of France. Already, in 1603, Henry IV had granted a patent to M. de Monts to settle a colony in North America between the 40th degree and 46th degree north latitude, and de Monts had been in America in 1604–05 attempting to locate his colony.

Naturally, therefore, the paper entitled "Reasons for Raising a Publique Stock," which was written about 1606 in advocacy of a grant by Parliament in aid of English colonization, urged forcibly the fact that "the French intendeth to inhabit Virginia." There is little doubt that the activity of France spurred the English to action and led to the grant of the Virginia charter by King James I in 1606. This was the beginning of that rivalry in the New World between these two powers, which continued for more than a century and a half.

The second motive in our classification, religious reasons were given a leading place in all the arguments advanced in favor of the colonization of Virginia. Sir George Peckham, in his tract on the "Causes for Western Population," written in 1582, states that the first and chief object is to carry to the savages "the most happy and gladsome tidings of the most glorious Gospel of our Saviour Jesus Christ, whereby they may be brought from falsehood to trueth, from darkness to light, from the hie way of death to the path of light, from superstitious idolatrie to sincere Christianity, from the devill to Christ, from hell to heaven." This motive was recognized in the Virginia charter of 1606, which states that one of the chief objects of the grant to be the "propagating of the Christian religion to such people as yet live in darkness and miserable ignorance of the true knowledge and worship of God, and may in time bring the infidels and savages living in those parts to human civility and a settled and quiet government." The next charter, that of 1609, declared that "the principal effect, which we can desire to expect [of this action], is the conversion and reduction of the people in those parts into the true worship of God." Even that seasoned adventurer and doughty warrior, Captain John Smith, pointed out that "the gaining Provinces addeth to the King's crown, but the reducing Heathen people to civilitie and true Religion, bringeth honour to the King of Heaven."

In two pamphlets, printed in 1609, to advance the interests of the Virginia company, entitled, the one "A True and Sincere

Declaration of the Purposes and End of the Plantation Begun in Virginia," and the other "Nova Brittania; Offering Most Excellent Fruites by Planting in Virginia," the same object is presented. The former tract, indeed, states that "the Principal and Maine Endes were first to preach and baptize into [the] Christian Religion, and by propagation of the Gospell, to recover out of the armes of the Divell, a number of poore and miserable soules, wrapt up unto death, in almost invincible ignorance." The latter declares, "As for supplanting the savages, we have no such intent. . . . We purpose to proclaime and make it known to them all—that our coming thither is to plant ourselves in their countrie, yet not to supplant and roote them out, but to bring them from their base condition to a farre better; First, in regard to God, the Creator, and to Jesus Christ, their Redeemer, if they will believe in him. And secondly, in respect to earthly blessings, whereof they have now no comfortable use, but in beastly bruitish manner; with promise to defend them against all publike and private enemies. . . . That as to our great expense and charge we make adventure, to import our divine riches to their inestimable gaine, and to cover their naked miserie with civill use of foode, and clothing, and to train them by gentle meanes to those manuall artes and skill, which they so much affect and admire to see in us." In promoting the settlement of many of the other English colonies, the propagation of the gospel among the heathen is presented as a prominent and sometimes as the chief reason for the undertaking. Truth, however, compels us to state that subsequent history showed that, with a few notable exceptions, such as John Eliot, "the Apostle to the Indians," and others in New England, the establishment of an Indian department at Harvard and at Williams and Mary, and the labors of certain of the Friends and Moravians, the English colonists, unlike the Spanish and the French, soon largely lost sight of the missionary motive and were chiefly actuated by less altruistic ones.

We come, then, to the consideration of the most important group of motives urged by the early advocates, namely, the

commercial and economic reasons for American colonization. First of these motives we may place the desire for gold. The success which had attended the Spanish explorers' quest for gold, and the untold wealth which had steadily flowed from the Spanish colonies into the coffers of the mother country, naturally awakened the cupidity of other countries. The tales of the Spanish explorers enticed the adventurer to go to Virginia, and led Englishmen to entertain an exaggerated notion of the abundance of the riches of the country. The well-known passage in the play of "Eastward Hoe," written in 1605, about a year before the granting of the first charter of Virginia, expressed in extravagant language the popular belief of the day. "I tell thee," exclaimed one of the characters, "golde is more plentifull in Virginia than copper is with us, and for as much rede copper as I can bring, I'll have thrice the weight in gold. Why, man, all their dripping-pans and all the chamber-potts are pure gold, and all the chaines with which they chaine up their streets are massie [ve] gold, all the prisoners they take are fettered in gold; and for rubies and diamonds, they goe forth in holydays and gather them up by the seashore to hang on their children's coats and sticke in their children's caps, as commonly as our children weare saffron-gilt-brouches and groates with hoales in them."

The first charter, as all the subsequent ones, in expectation of the discovery of the precious metals, made provision for reserving to the king one-fifth of all the gold and silver and one-fifteenth of all the copper mined within the country. The stockholders of the London Virginia Company confidently hoped that gold would be found in such quantities as to bring them a fortune. When Captain Newport sailed for Virginia with the "First Supply" he was accompanied by two goldsmiths, two refiners and one jeweler. It was reported at this time in Virginia there was among the colonists "no talk, no hope, no work, but dig gold, wash gold, refine gold, loade gold." Captain Newport took back with him a load of shining dirt, which, after repeated assays in England, was pronounced as "fools gold."

When Captain Newport sailed again with the "Second Supply" he was instructed by the directors of the company not to return until he brought back a lump of gold, or found a northwest passage or some of the Raleigh colonists. Although later the quest for gold was extended into the interior, the desired metal was not found in paying quantities.

Second in importance of the controlling motives that inspired the partners of the Virginia venture was the discovery of a more direct route to Asia. Since Frobisher's first search for a northwest passage, in 1576, the English had kept this object prominently in view, and several expeditions had been sent out to discover it. Of the two routes the southeastern, around Cape of Good Hope, first discovered and made use of by the Portuguese, and the southwestern around Cape Horn, discovered by the Spanish, the former was the most frequented by the various European nations contending for the monoply of Oriental trade. Each European power saw the advantage to be gained by the nation which should control a shorter route to China, India and the spice-producing islands. The belief that it was but a short distance through the continent of America seemed to have been generally held by Englishmen of the age. The first colonists to Virginia were most explicitly instructed in regard to the search for a passage connecting the two oceans, and a few days after their arrival Captain Newport began the work of exploration. In their search they were vainly encouraged by the tales of the Indians, who probably had the Great Lakes in mind. Near the close of its existence the Virginia Company presented the possibility of finding a passage from Virginia to the South Sea, as the Pacific was called, as one of the advantages of its colony. It was some time before this belief was given up, for as late as 1650, in the tract, "Virginia—Richly and Truly Valued," it was claimed that "the planting of this Collony will open a most compendious passage to the discovery of those more opulent Kingdomes of China . . . Japan, the Phillipines, Summatras, and all those beauteous and opulent Provinces of the East Indies which beyond dispute

lye open to those seas which wash the southwest parts of Virginia." At first the importance of America in itself was not realized and the continent was in fact regarded as an obstacle in the way of the direct route to the coveted commerce of the Orient.

Dr. Beer has truly said that "the chief economic benefit that England expected to derive from colonial expansion was freedom from dependence on other European rivals." "This desire . . . formed the underlying basis of English commercial and colonial expansion." It was expected that the new colonies would supply England with a large number of articles that it was now obliged to purchase from foreign nations, which tended to take the precious metal out of the country. From the standpoint of the mercantilist theory which then held sway, this must be guarded against. Foreign commerce was regarded as a kind of warfare, in which the balance of trade must be carefully watched. One of the Virginia stockholders urged as a reason for upholding the colony, that it was "a land ready to supply us with all necessary commodotyes wanting to us." To illustrate: the importance of the development of the American fisheries was early urged not only as a means of freeing England from her dependence upon the Dutch for the large portion of her consumption of fish, but also to enable her to supply other European countries from the expected surplus. Various other commodities it was hoped the colonies would supply, but those especially desired were silks, wines, spices, drugs, naval stores, timber and soap ashes. Early in the history of Virginia the effort to raise silkworms and the mulberry tree was begun, and before the colony was nine years old it was able to send to England silk that had doubtless cost more than a hundred times its market value. But after some years of discouragement the experiment was given up. At a later period, however, the English Government endeavored to encourage its production in the colonies by offering bounties. Even as late as 1769 Parliament passed an act offering a premium of £25 on every £100 value of raw silk grown in the colonies, entered in the port of London.

To introduce the culture of the vine and the manufacture of glass, early in the history of Jamestown French vine-dressers and Italian and German glass-makers were sent out to instruct the colonists in these pursuits, but little success attended their efforts. Greater results flowed from the policy subsequently adopted by the English Government for the encouragement of the production of naval stores, indigo, lumber and pot and pearl ashes.

Two other commercial considerations also had weight. It was urged by the various writers that the establishment of colonies would enlarge the trade of the kingdom and create a new market for English manufactured goods, especially woolens, and further, that the number of ships and mariners would be increased. "It is very certain," wrote Sir George Peckham, in 1582, "that the greatest jewell of the whole realme, and the chiefest strength and force of the same, for defence or offence in martial matter and manner is the multitude of ships, masters and mariners ready to assist the most stately and royall navy of her Majesty, which by reason of this voyage shall have both increase and maintenance." In proof of this he pointed to the experience of Spain and Portugal, "who, since the first discovery of the Indies, have not only mightily enlarged their dominions, greatly enriched themselves and their subjects, but have also, by just account, trebled the number of their ships, masters and mariners, a matter of no small moment and importance." In fact, the establishment of the American colonies was a most important step in the successful competition with the Dutch merchant marine and the upbuilding of English shipping.

Finally, as the last of the economic reasons, it was pointed out that the colonies would furnish a vent for the superfluous population of England, with which contemporary writers believed it was afflicted. Both Sir Humphrey Gilbert and Sir George Peckham early suggested that the poor and idle of the realm could be sent to America, with great profit to themselves and the mother land. There is considerable evidence to show that this consideration appealed strongly to the statesmen of

James I. The Spanish ambassador to England, indeed, reported to his own government in 1611, that "the principal reason for colonizing those parts is to give an outlet to so many idle and wretched people as they have in England, and thus prevent the dangers that may be feared from them." In the tract, "A Good Speed to Virginia," issued in 1609, the over-population of England is referred to in the following scriptural language: "We are now for multitude as the thousand of Manasses, as the ten thousands of Ephraim. . . . We are a great people and the land is too narrow for us." In view of the present dense population of England, it at first sight may appear quite remarkable that the number of inhabitants of England at the opening of the seventeenth century should have been considered too great for safety. An examination of the economic conditions furnished the key to the explanation. Old industrial institutions and methods were passing, and the readjustment of society to the new conditions had not been fully effected. As a result, pauperism was prevalent. Thousands appear to have been without work and shifting from one part of the country to another, so that the "vagabonds and sturdy beggars," in spite of much drastic legislation, were a positive terror to quiet folk in the rural districts.

The low scale of wages of both the rural laborer and the city artisan hardly sufficed to provide them with the bare necessities of life, and in some villages more than one-third of the population was compelled to rely in part upon charity for subsistence. Indeed, Doyle, the English historian of the colonies, says that "Virginia was the offspring of economic distress in the mother country, as New England was of the ecclesiastical conflict." While this is probably an exaggeration, it is not surprising that it was expected that a considerable number of the poor would be led to take advantage of the opportunity to find for themselves homes in Virginia, in return for service for a term of years as indentured servants of the colony.

The various advantages to be gained by sustaining the Virginia colony were summed up by the Rev. William Crashaw, in

a sermon preached before the Virginia Company in London in 1610, as follows: "Hereby, we shall honor ourselves by propagating our owne religion; hereby we shall mightily advance the honourable name of the English nation, the honour whereof we ought everyone to seek; hereby we shall mightily inrich our nation, strengthen our navie, fortifie our kingdome, and be lesse beholding to other nations for their commodities; and to conclude, hereby we shall rectifie and reform many disorders which in this mightie and populous state are scarce possible to be reformed without evacuation."

Many of these motives, as already has been stated, played a large part in the settlement and early history of the Virginia colony. The colony, however, owing to ignorance, the poor character and unfitness of the settlers for such an enterprise, the blundering methods followed and the hardships encountered, increased very slowly.

It is estimated that the company, in the eighteen years of its chartered existence, expended upward of £200,000, a sum equal to $1,000,000 in our currency, and Alexander Brown shows that it sent over at least 5,694 emigrants. As a commercial venture it was largely a failure; the company received back from the colony but a small part of the money invested, and of all the emigrants whom it sent over, and their children, only 1,227 survived in 1624, when the rule of the company came to an end.

However, the foundation for a successful colony had been laid during this period. This may be attributed to three factors: First, the successful culture of tobacco and the increasing demand for it in England; secondly, the establishment of the family system; and, thirdly, the granting the colonists a share in their own government.

Tobacco, Sir John Hawkins is credited with having introduced into England in 1565. The stimulant rapidly grew in favor. In spite of the opposition of James I, who issued, in 1604, his "Counterblast against the detestable weed that works a new corruption of men's bodies and manners," and that of some of the writers under his patronage, there were, it is said, 7,000

shops in London, in 1614, where tobacco was sold. John Rolfe, the husband of Pocahontas, began experimenting with tobacco culture in Virginia in 1612, and within four years it became the staple product of the colony.

Owing to the industrial situation in England, the prospects of the country's securing an ample supply of laborers appeared good. These expectations were not realized; the bad news from the colony and the report of the great mortality made it increasingly difficult to obtain servants.

Accordingly, the company was obliged to resort to various expedients to meet the demand for laborers. Appeal appears to have been made to justices of the peace to sentence vagabonds and sturdy beggars to banishment to the colony, on pain of death in case of return. Even prison doors were sometimes opened and convicted felons were sent to the colonies. The company was apparently glad to secure the waifs and strays of the city streets. In 1619 the city of London delivered to the company 100 poor children to be sent over to the colony to be bound out for a term of years. This was the beginning of a common practice. In one year, 1627, some 1,500 were sent out. Kidnapping or "spiriting" seems also to have been resorted to, but probably not with the connivance of the company. Later in the century it grew to considerable proportions, one writer stating that "about 1670 no fewer than 10,000 persons were spirited from England in one year."

The introduction of the family system had an immediate effect upon the success of the colony. Only a few women had come out prior to 1619, but in that year the company, inasmuch as the colonists "were not settled in their minds to make it their place of rest and continuance," determined "for the remedying of the mischiefe, and the establishing of a perpetuitie to the Plantation, to send them over one hundred young Maides to become wives—that wifes, children and familie might make them lesse moveable and settle them, together with their Posteritie in that Soile." In the course of the year ninety maids, certified as "younge, handsome and honestly educated" and

"such as were especially recommended unto the company for their good bringing up" arrived. The company charged the prospective husbands 120 pounds of tobacco each to cover the cost of passage. "Young or old, handsome or homely maids," we are told, "did not prove a drug." Other shiploads followed, but women were still scarce in the colony. There is some evidence that illegal attempts were made "to press maidens to be sent to Virginia."

The last of the chief factors insuring the success of the colony was the granting the colonists, in 1619, a House of Burgesses, in which they should have a voice in the enactment of laws and the levying of taxes. This marks the introduction of representative institutions in America, so characteristic of the English colonies, and which were so jealously prized as one of the most cherished rights of Englishmen. This concession of the company was the cause of great satisfaction to the colonists, and was the means of attracting additional immigrants. The report that the king intended to vacate the charter of the company so alarmed the colonists for fear that they would be deprived of their recently acquired rights that they petitioned the Privy Council, humbly entreating them "that we may retain the Libertie of our General Assemblies, than which nothing could more conduce to our satisfaction or the publique utilitie." Fortunately, however, representative institutions survived the overthrow of the company.

Although the Virginia Company had not realized the financial returns they had expected, the subject of the colonization of America had been given such publicity and had taken such a hold upon the thought and imagination of the English public, that in the troublous days that soon followed, the shores of the New World naturally were turned to as a haven of refuge.

The religious and political situation in England, however, proved to be more effective in stimulating colonization than its economic condition or the commercial inducements of the colonies. The pioneers of the religious refugees, the Pilgrims, who settled at Plymouth in 1620, after ten years numbered only

some 300. But the triumph of absolutism in church and state led to the great "Puritan Exodus" to New England. During the eleven years that Charles I reigned without a Parliament, 1629 to 1640, some 21,000 emigrants came out. Of these it has been said "God sifted a whole nation that he might send choice grain into the wilderness." One-quarter of our present population, it has been estimated, are descendants of these Puritan pioneers. With the outbreak of the civil war in England, however, this emigration ceased. In the meantime there had been a smaller migration to Maryland, which had been founded in 1634, consisting of some English Catholics, but more Protestants, and a constant flow of colonists to Virginia, a considerable portion of which was of the poorer class. A report of 1638 states that "scarcely any came but those who are brought in as merchandise to make sale of." At this same period the "Customer of London" declared that "most of those who go thither have ordinarily no habitation, can bring no certificate, and are better out than within the kingdom." By 1640 its population was estimated at 7,500. However, the triumph of the Parliamentary forces caused a great Cavalier emigration to Virginia, which not only more than doubled its population in ten years, but also markedly raised the character and prosperity of its inhabitants. It should, however, be borne in mind, as Professor Channing has pointed out, that the popular tradition that the "Cavaliers" who came to Virginia were the social superiors of the "Puritan" emigrants to New England is unwarranted, as both were drawn from substantially the same social class.

While these continental settlements were being made, England also was acquiring island colonies in the West Indies and the waters adjacent thereto. These included the Bermudas, originally a part of the territory of the Virginia Company; the Barbadoes, settled as early as 1624, and becoming so popular and prosperous that by 1650 it had attained a population of over 6,000; Jamaica, captured in 1655 by Cromwell's fleet from the Spanish, and the largest of her insular possessions in the

new world. To these were added several of the Leeward Islands and subsequently the Bahamas.

By 1660 the total population of the English continental colonies is believed to have been upward of 80,000, about equally divided between the New England and the two southern colonies.

Meanwhile, in the middle region, lying between the two groups of English colonies, the Dutch and Swedes had planted settlements. The former had taken possession of the Hudson Valley and the western part of Long Island; the latter had a foothold on the banks of the Delaware. The Swedish colonists were never numerous, and after seventeen years of precarious existence, in 1655 their small settlements of two or three hundred souls passed into the control of the Dutch. The Dutch, more prosperous and populous than the Swedes, were much less so than their English neighbors, owing to the narrow policy of the Dutch West India Company, but by 1664 New Netherland had reached a population of 7,000. This, however, was not exclusively Dutch, for even at that early date the future metropolis was a cosmopolitan city. Eighteen different languages are reported to have been spoken in New Amsterdam in 1643, and the English had overrun a considerable part of Long Island. The English government, shortly after the Restoration, jealous of the Dutch, decided to wrest the middle region from them. This was accomplished in 1664, and while the Dutch population long remained an important element in New York, the Anglicizing process at once began.

In the period between the Restoration and the English Revolution of 1689 a few colonists came to New England, more to Virginia and Maryland, and a beginning of the colonization of the Carolinas was made, but the greatest immigration was to the middle colonies. East and West Jersey were settled, the former by English direct from England or from the Puritan colony of New Haven, the latter by English Quakers, and the "Holy Experiment" in Pennsylvania had made a most prosperous beginning, with its English and Welsh Quakers and a few Germans, the forerunners of the great eighteenth century migra-

tion. By the close of this period the middle colonies numbered about 40,000 inhabitants, or about half as many as New England; the southern colonies contained over 80,000, while the total population of all the English colonies is believed to have been about 200,000, and by 1700 it is estimated as 262,000.

With the eighteenth century there came a great change in both the character and methods of colonization. During the seventeenth century, as has been seen, the colonists were largely English, but in the eighteenth century the immigrants were chiefly of other races, nearly all the countries of northwestern and central Europe being represented. The foreign immigrants went chiefly to the middle and southern colonies. They were not especially welcome in New England nor did its economic opportunities particularly attract them. On the other hand, the industrious foreigner was encouraged to come t the other colonies, as his presence was desired to assist in the development of the country. Land could be had on easy terms, and some of the southern colonies, to attract settlers, offered free grants of land or exempted land from taxation for a term of years. The possession of land held out not only promise of material prosperity, but also that of social rank and political privilege. Many of these colonies also passed naturalization laws conferring on aliens political privileges. These colonial statutes were supplemented and in part superseded by general naturalization laws passed by Parliament.

Systematic efforts to attract colonists by advertisements were also made. William Penn was almost the first to adopt these modern methods on an extensive scale. Not only did he make special trips to the continent, but also to attract immigrants he distributed widely circulars in several languages presenting the advantages of Pennsylvania in glowing colors; advantages that made their appeal alike to the landless and those persecuted for religious reasons. "The whole movement," as a recent writer has pointed out, "closely resembles that of the nineteenth century, when the northwestern states held out inducements to the Swedes and Norwegians." During the

eighteenth century immigrant agents, the forerunner of their twentieth century counterpart, also made their appearance, being employed by ship companies, especially in Holland, England and Ireland, to recruit passengers for their ships. On the continent they were known as "Newlanders," and because of their unscrupulous methods were stigmatized as "Soul-sellers."

The system of sending over immigrants who were without the means to pay for their own transportation and permitting them to redeem their passage by being bound out for a term of years as indentured servants had been in vogue since the early days of Virginia and Maryland. This method, however, was more extensively employed in the eighteenth century, especially in the case of the German and Irish emigrants. Such persons were popularly known as "redemptioners." The system was not abolished until well into the nineteenth century.

The contemporary accounts of the sufferings and privations endured, and the enormous mortality resulting from the crowding and unsanitary conditions on these immigrant ships are well-nigh incredible and rival in horror the records of the "middle passage" of some of the African slave ships. One instance must suffice. A ship arrived at Philadelphia in 1745 with only fifty surviving passengers out of four hundred.

The most important of the non-English racial elements among the colonists of the eighteenth century were the French, the German and the Scotch or Scotch-Irish. Already an important and valuable, although not large, French element had been introduced into the population, through the coming of the Huguenots, who, especially in the years following the Revocation of the Edict of Nantes (1685), found their way into nearly all the colonies, but were especially numerous in South Carolina and New York. They and their descendants exercised in the subsequent history of the country an influence far in excess of their relative numbers.

A few Germans seem to have come to America with the Swedish and Dutch settlements, but it was not until the found-

ing of Pennsylvania that any considerable number arrived. Their migration has been divided into three well-defined periods. The first from 1683 to about 1709, during which there was a small immigration to the middle colonies. Of these there came to Pennsylvania, perhaps a few score a year, of certain religious sects, chiefly Mennonites. The second period, 1709–27, opens with the coming of the Palatines, some 13,000 of whom, in consequence of the ravaging of the Palatinate by war and the prevailing religious and economic tyranny, had taken refuge in England, in 1709, with the hope of being aided to America. Queen Anne's government sent some of them to Virginia and the Carolinas, but more than 3,000 were transported to New York, where an unsuccessful attempt was made to employ them in the production of naval stores. Many of them, in a few years, settled in the Mohawk and Schoharie Valleys, but a few hundred, dissatisfied with their treatment, eventually found their way into Pennsylvania. About 1710 Swiss Mennonites and Palatines began to come directly to Pennsylvania, followed by Dunkers and various other sects. By the close of the second period a conservative investigator places the number of Germans in this colony as between fifteen and twenty thousand. During the period 1727 to 1775, the number of immigrants reached enormous proportions. While a few hundred Germans and Swiss found their way directly to some of the southern colonies, especially to the Carolinas and Georgia, by far the greater number came to Pennsylvania. A careful estimate by Kuhns of the number passing through the port of Philadelphia, based upon the lists of arrivals during this period, gives an aggregate of nearly 70,000. Almost one-half of these fall within the six years 1749–54. So numerous were the German immigrants that the English colonial authorities were at times alarmed for the safety of the colony. Franklin, in 1753, expressed the fear that "we will not be able to preserve our language and even our government will become precarious." Two years later, Dr. Douglass was apprehensive that Pennsylvania would "degenerate into a foreign colony" and even endan-

ger the security of the neighboring provinces. Later, Edmund Burke expressed the regret that the Germans did not assimilate with the English colonists, but "by their industry, frugality and a hard way of living, in which they greatly exceeded our people, have in a manner thrust them out in several places."

As will be noted later, many of the Germans found their way subsequently to other colonies, but the majority of the authorities agree that in 1775 they comprised about one-third of the total population of Pennsylvania, or about 100,000. That Penn's avowed purpose of laying "the foundation of a free colony for all mankind" was in course of fulfilment is apparent from the following passage from Gottlieb Mittelberger's interesting account of his "Journey to Pennsylvania," in 1750. Pennsylvania "possesses great liberties above all other English colonies, inasmuch as all religious sects are tolerated there. We find there Lutherans, Reformed, Catholics, Quakers, Mennonites or Anabaptists, Herrnhuters or Moravian Brethren, Pietists, Seventh Day Baptists, Dunkers, Presbyterians, Newborn, Freemasons, Separatists, Freethinkers, Jews, Mohammedans, Pagans, Negroes and Indians. The Evangelicals and Reformed, however, are in the majority." But even his enumeration was not complete, as it did not include the Schwenkfelders. Most of the later immigrants, however, did not come for religious reasons, as was the case with the sectaries of the earlier periods, but they were chiefly of the peasant class, who were seeking relief from the burdens of feudalism. They were an honest, industrious, peaceable and religious people. Content with their newfound prosperity, they took comparatively little part in colonial politics. Settling together, they largely comprised the population of certain counties. So conservative were they and tenacious of their customs and language that whole communities today speak the dialect popularly known as Pennsylvania Dutch. Many of the descendants of the early German settlers of Pennsylvania have played an important rôle in the political and educational history of the commonwealth.

An equally important non-English element introduced into

the colonial population was that of the Scotch-Irish, or, better, the Scotch Presbyterians from Ulster, Ireland. Here their ancestors had colonized in the seventeenth century, but after a few generations, driven by the religious bigotry of the established church, the commercial jealousy of England, and the oppression of the landlords, they now sought a refuge across the sea. The emigration began about the opening of the eighteenth century, but assumed a considerable proportion by 1718. It is estimated that between 1725 and 1768 the number of emigrants was from 3,000 to 6,000 annually. In consequence of the famine of 1740, it is said 12,000 left Ireland annually for several years for America. Doubtless some of them were pure Irish, as well as Scotch-Irish. A decided impetus was given to the movement in the early '70's, in part growing out of the wholesale evictions, due to the exorbitant increase in rents. Contemporary figures show that in the five years 1769–74 no less than some 44,000 departed from the ports of North Ireland. Froude says "that ships could not be found for the crowds that wanted to go." As a result of this emigration, about one-half of the Presbyterian population of Ulster came to America. A recent investigator states that "Scotland was contributing even more, at this time, to the exodus than was Ireland." This movement alarmed the local authorities, who feared "that the outward stream might eventually depopulate the country." Some of these went to New England, settling in central Massachusetts, southern New Hampshire and the district of Maine; others to Nova Scotia and New Brunswick; and several thousand sailed directly to Virginia and the Carolinas, but by far the great majority landed first on the shores of the Delaware and took up their settlements on the frontiers of Pennsylvania, and spread from there. During the early stages of this immigration, James Logan, the agent of the Proprietor, and a native of Ireland, but a Quaker who evidently had no love for the Scotch-Irish Presbyterians, declared: "It looks as if Ireland were to send all her inhabitants hither; if they continue to come they will make themselves proprietors of the province." Fre-

quently they settled on the soil as squatters, without going through the formality of securing grants from the Proprietor. "These bold and indigent strangers," Logan continues, "saying as their excuse when challenged for titles that we had solicited for colonists, and they had come accordingly, and asserting that it was against the laws of God and of nature that so much land should be idle while so many Christians wanted it to work on and to raise their bread."

Many Germans also followed the practice of settling on the land without title. As early as 1726, a careful investigator states that there were 100,000 squatters, and between 1732 and 1740, another scholar estimates that there were 400,000 acres settled without grants in this colony. The Scotch-Irish settlements in Pennsylvania steadily advanced westward, until by the period of the Revolution, Pittsburgh became their advanced post and center of influence in this direction. One of its sons of our own day has said of Pittsburgh: "It is Scotch-Irish in substantial origin, in complexion and history; Scotch-Irish in the countenances of the living and the records of the dead." Pennsylvania has been rightly called "the seed plot of frontier emigration," for beginning about 1732 a constant stream of emigrants, composed of Germans and Scotch-Irish folk, the latter predominating, flowed to the south and southwest along the great valleys into the Piedmont region of Maryland, Virginia and North Carolina. Eventually the Scotch-Irish penetrated further into South Carolina and Georgia. This self-reliant, sturdy and God-fearing people formed the chief element in the population of the frontier counties from Pennsylvania to Georgia, overflowing into what later became Kentucky and Tennessee. "Their preachers," says Professor Turner, "with the rifle at the pulpit's edge, preached not only the theology of Calvin, but the gospel of freedom of the individual and the compact theory of the state." They constituted a new order in America and presented a striking contrast to the settlers along the coast. They gave a decidedly democratic tone to western thought in the Revolutionary Era. It is estimated that the

Scotch-Irish comprised one-third of the population of Pennsylvania and about one-sixth of all the colonists at the Revolution. They and their descendants have played a large part in the political, military, religious and educational history of the country.

The British colonists were, in general, a substantial and highly moral folk, but it appears to be true that among the indentured servants there was a considerable number of transported criminals. Some political offenders were sent to America, chiefly Scotch prisoners of war. A few hundred captured at the battles of Dunbar and Worcester, in 1650 and 1651, were sent to New England and Virginia. Again, following the suppression of the uprisings in Scotland, in 1678 and 1716, and after the battle of Culloden, in 1746, companies of Scotch Highlanders were sent as prisoners respectively to Virginia, Maryland and South Carolina. But recent investigation seems to indicate that by far the larger number of convicts sent to America were not political offenders.

Some criminals were sent to the colonies in the earlier periods, but the practice became more common after the English statute of 1670, and especially after the act of 1718, by both of which transportation to America as indentured servants for from seven to fourteen years was permitted in place of long imprisonment or of capital punishment for certain crimes. The records of Old Bailey alone indicate that between 1717 and 1775 not less than 10,000 were transported. Doubtless in many of these cases there were mitigating circumstances, owing to the severe character of the English criminal code. Proof exists that all the middle and southern colonies served, to some extent, as penal settlements, but the most of the prisoners appear to have been shipped to Virginia and Maryland. Stith, in his history of Virginia, published in 1747, wrote: "Virginia has come to be reputed another Siberia, or a hell upon earth." Scharf estimates the number of banished criminals in Maryland at 20,000, one-half entering after 1750; others that a total of 50,000 was sent to all the colonies.

Churchill wrote, in 1764, when the tide of convict influx into America was high:

> Happy, thrice happy now the savage race,
> Since Europe took their gold, and gave them grace.
> And on sure grounds the gospel pile to rear
> Sends missionary felons once a year.

"Such a source of emigration tended to fill the colonies with restless and violent inhabitants, whose influence was bound to demoralize both the British and native peoples among whom they came to settle." Some of the colonies objected and passed laws to exclude or tax them, which were disallowed by the crown. Franklin satirically suggested that the colonists should retaliate by sending rattlesnakes to the mother country, in the hope that under changed conditions they might free themselves from their evil habits. But the servant class was not recruited chiefly from the criminals. The majority of them were honest emigrants, who were attracted by the opportunities afforded by America to gain a new start in life, and so were induced to agree to redeem their passage over by being bound out as indentured servants. This class was very considerable in both the southern and middle colonies. They were more numerous and important than slaves in the South during the seventeenth century, and formed a very considerable and important factor in the economic life of the middle colonies in the following century. Pennsylvania had an especially large number, mostly Germans and Irish.

In addition to the whites, representing almost all the various branches of the Teutonic and Celtic races, there was a large foreign element imported into the colonies, namely, the African negroes, who were held as slaves. It is a familiar fact that twenty negroes were introduced into Virginia in 1619, but these were in point of law not slaves, but servants, as Professor Ballagh has clearly demonstrated. Nevertheless, from this small beginning was to flow mighty and far-reaching consequences in the subsequent history of the country. It is not generally known,

however, that negro labor was an unimportant factor in the colony during the first half of the seventeenth century. Not until thirty years after the first importation did the number of negroes amount to 300, and it was not until 1661 that slavery was established by law in Virginia, and two years later in Maryland. From that time on they increased rapidly in both colonies, so that by the opening of the new century they probably equaled the number of indentured servants in these colonies. Slaves were introduced early into the Carolinas, and by the close of the seventeenth century outnumbered the whites in South Carolina, but elsewhere they constituted only a small minority of the population. The African slave trade became an important branch of foreign commerce in the last quarter of the same century. The policy of the English Government and the growing demand for slave labor on the plantations in all the southern colonies led to a great increase in their number. It is estimated that between 1676 and 1776 three and a half millions of negroes were carried from Africa to British North America and the West Indies. One-fifth of that number died on the voyage, and a quarter of the rest perished in "their seasoning." The total slave population of the continental English colonies by 1750 is estimated at about 300,000, and in 1775 at 500,000, or approximately one-fifth of the total pupulation. Fully four-fifths of these were in the colonies south of Pennsylvania, and comprised about one-third of the inhabitants of that section. Here was a racial element destined in time to affect materially the development of the life and thought not only of the South, but also the political and social history of the whole country.

The population of the thirteen colonies steadily increased during the eighteenth century. Starting with slightly more than a quarter of a million at the opening of the century, by the end of the first twenty years it had reached a half a million. Twenty years later, in 1740, it had passed the million mark, and by 1767 it had grown to two million. At the opening of the Revolutionary War it exceeded two and one-half millions. Of this number, it is estimated that about one-third were immigrants.

The basis of the population, as we have seen, was of Anglo-Saxon stock. The New England people were almost pure English, with a slight intermixture of Scotch-Irish and other elements. The middle colonies possessed the most composite population, with the descendants of the Dutch in New York and New Jersey, of the Swedes in Delaware, and the Welsh and the large German and Scotch-Irish elements in Pennsylvania. In the southern colonies the Anglo-Saxon stock predominated, especially in tide-water Virginia, but there were the important French Huguenot element in South Carolina, the Scotch in North Carolina and Georgia, and the Scotch-Irish and German settlers in all the back counties. The middle region, however, with its mixture of nationalities, its many religious sects, its varied social conditions, its diversified economic life, and its mixed political institutions, has been truly characterized as "the typical American region," the prototype of the modern United States. Such was the composite character of the population of the thirteen colonies on the eve of the contest which was to secure for them a place among the nations of the earth.

THE ANIMAL AS A FACTOR IN THE HIGH COST OF LIVING

By Carl W. Gay

Professor of Animal Industry, University of Pennsylvania

I trust no one has come here in the hope of learning how to do what even the Democratic administration has failed to do—reduce the cost of living. I have no particular ways and means of overcoming this difficulty under which we all live to suggest, but have chosen this topic with the express purpose of increasing your interest in and appreciation for the work of those engaged in the great livestock industry of this country. Recent events have shown more convincingly than ever before that agriculture is the bulwark of business and livestock is the keystone of agriculture. This is the primary importance of the animal as an economic factor.

Conservation is one of the first essentials in economy and the farm animal is a conservator of farm resources. Successful agriculture depends upon soil fertility. We cannot make two blades of grass grow in place of one without increasing the amount of available plant food in the soil. It is possible but hardly practicable in most parts of this country to maintain the fertility of the soil without keeping livestock upon it. Eighty-five to ninety per cent of the fertilizing value of the farm crops fed to livestock is returned to the soil from which they were grown. How rapidly then is the fertility depleted when the crops are sold off, rather than fed upon, the farm.

Not only is the fertilizing value of this class of feed stuffs saved by feeding it to stock, but marketing any crop through livestock instead of in its original form saves 87½ per cent on the freight, eight pounds of dry matter in the form of feed being represented in one pound of meat or milk. This fact has led

some railroad officials to discourage cattle feeding in some sections on account of the reduction in the amount of freight to go out over their lines. This reasoning is not altogether logical, as much of the forage that might go to make weight in the animal on which freight should be paid, would not otherwise leave the farm and therefore make no business for the railroad. For every pound of corn that grows there is an equivalent amount of stover; for every pound of oats, wheat or barley a corresponding quantity of straw. These materials are bulky and therefore not readily marketable. They would be of little use on the farm were it not for the ruminating cattle and sheep whose digestive apparatus is so constructed that they readily digest this roughage, transforming it into a highly nutritious, digestible and concentrated form of food, as meat and milk.

The part played by animals in rural economics will be better appreciated after a consideration of some of the fundamental facts underlying their domestication and use.

Farm animals are referred to as domesticated to distinguish them from animals in their feral or native state. Domestication is the substitution of an artificial for a natural environment. By this substitution the animal becomes dependent to a greater or less extent upon the husbandman, who in turn assumes a moral, if not civil, obligation to take in production only what he pays for in the artificial environment with which he surrounds the animal. Let us look at the balance sheet of the master in account with his horse. Under feral conditions the horse utilizes his power of locomotion for his own sustenance and protection. He is required to graze over large areas of none too abundant pasture in order to get enough to eat, while the water course or salt lick upon which he depends may be a long distance from his grazing ground. On the way to the former he may be overtaken by predatory foes or storm, against which he must protect himself by resorting to speed in flight or strength in combat. Under such conditions he is very busily engaged making a living. Under domestication of the highest type the

horse is furnished with all that he requires to eat and drink as well as adequate protection, without any effort on his part. In return he is called upon to expend the energy which is thus saved to him in work of whatever sort he is best adapted to. If the master be unjust in his demands or in his provision for his horse's well being, the account is overdrawn.

Animals reproduce under conditions of natural environment in accordance with the law of the survival of the fittest. Fitness in this case means the degree to which the animals can adapt themselves to the conditions of life imposed by the environment. Under domestication fitness to survive is decreed by the husbandman who selectes with the view of economic production through specialization of function. The basis of specialization is some function normal to the animal, as the production of milk or of a fleece, which is developed, not in the direction of fitness to survive, as in natural selection, but to meet the specialized demands of the husbandman.

Birth endowments cannot be exceeded, *i. e.*, any character or function naturally possessed may be increased, generation, by generation, through selection, but no distinctly new character can be added. We can feed fat into a beef steer, but no amount or quality of ration will carry his growth of muscle beyond the natural development with which he was endowed at birth. We may select the most thickly fleshed individuals as progenitors of the next generation and so raise the average of merit in thickness of flesh, but we cannot make the steer grow mutton or pork—only beef.

This is the theory; what is the practice? We must still increase productive efficiency if we are to reduce the cost. With fixed overhead charges, fixed cost of production per cow and fixed price of the product, as seems to be the case with milk, there is only one way to widen the margin of profit and that is to get more milk from each cow. The selling price being fixed in this case, by public opinion, the producer is the one to be pinched; otherwise he might protect himself by increasing the price to the consumer, as in the case of meats.

More economic production per unit of product is one of the logical means of lowering cost to the consumer.

It costs so much to feed, care for and stable a cow; the more milk she makes, the less it costs per quart to produce it. Some of the dairymen who protest most earnestly because you consumers will not pay more than eight cents for milk are keeping in their herds cows whose production does not cover the expenses charged against them—they are boarders and the dairyman wants you to help pay their board just as the grocer expects you and me to take care of the bad accounts on his books.

This is my point: we, as consumers of milk, meat and eggs, wearers of woolens and users of market commodities, the production, manufacture and sale of which involve the horse, are more vitally concerned than we think with the work of the live-stock breeder. The production of economically efficient animals on his part reverts, in case the increased margin of profit is not absorbed by the middleman, to our advantage, not only in the lower cost of most of the necessities of life, but in a higher quality of product.

A review of the breeders' achievements in developing economic efficiency in animal production by selection is interesting and instructive.

Under natural conditions the horse utilizes his muscular power to move about in quest of sustenance and occasionally in combat, chiefly with others of his kind. In striking contrast is the modern draft horse of 2,300 pounds weight, whose whole structure is so well designed for draft power that he can register a pull on the dynamometer of 75 per cent of his weight and do work equivalent to 6,000 foot tons per day.

Whatever speed the feral horse possessed was sufficient only for his protection, but from this primitive beginning there has been evolved a distinct speed type, whose performances at trot, pace or run, on the flat or over the steeplechase course, are nothing short of marvelous.

Originally most horses were diminutive in form and gross in appearance, but they have been bred to the highest degree of

show attainments—extreme refinement and most extravagant style and action.

Then, too, the undomesticated horse had no weight imposed upon his back during his daily routine, while now we have horses so well adapted, structurally and functionally, to carry weight, that a 200-pound man is no serious impost to gallop cross-country with. Furthermore, their way of going has been so well perfected as to render them capable of giving a most delightful ride.

Cattle originally possessed, like the horse, only such a muscular system as might be required in locomotion, but have been selected for natural flesh and the economy with which they can produce high-class carcasses of beef, acceptable to the most fastidious connoisseur. The typical beef steer has been so molded, through generations, that he may mature almost to ton weight in his two-year-old form, dress 60 to 70 per cent of his live weight, and carry the major part of his carcass weight in the regions of the most valuable cuts, of which he yields the greatest amount of highest quality.

The primitive bovine female had her calf in the spring, that time of the year when the natural pastures were in the best condition to stimulate and maintain the milk flow. She gave only milk sufficient, and of such quality, as would nurture her calf and as he approached a self-sustaining age she gradually went dry. The modern dairy cow affords a most striking contrast. By selection, and the high type of artificial environment with which the husbandman has surrounded her, she is made to freshen at any season of the year and continues to milk most persistently for eight, ten or even twelve months. Her annual production in milk may be twenty to thirty times the weight of her body and of such rich quality as to yield the equivalent of her body weight in butter fat, in record instances.

The sheep was one of the first animals to be domesticated and offers a most striking example of the extent to which a specialized function may be developed through breeding.

Originally clothed in a double coat of hair and wool, the outer hair coat has been so completely bred off and the fleece so much improved that any vestige of the old hair coat now is a discredit to the sheep and his breeder, as well as seriously affecting the value of the fleece. Not only do sheep shear high-class fleeces, but the breed of the sheep determines with unvarying regularity the precise class of wool that can be shorn from it. We have the fine wool breeds, whose fleece is so fine, although short, as to make up into the best grades of woolen cloths, flannels, etc.; middle wool breeds, whose fleeces are of delaine grade; and long wool breeds, whose fleeces are made up of such long and strong staple as to permit of the combing process involved in the manufacture of worsted goods.

The mutton derived from sheep bred especially for their fleeces is not of good quality and the carcass is light, hence a distinctive type of mutton sheep has been evolved—one that is as productive of a mutton carcass as the beef steer is of beef. All sheep, naturally, have fleeces, but the fact that wool and mutton are no more correlated than milk and beef has resulted in some sacrifice of the texture and amount of the fleece, although the delaine and combing wools are derived from sheep which are essentially mutton.

Ezra Kendal alleges that "pigs is pigs," and so they are generally regarded. However, even here, the work of the husbandman is strongly in evidence. The natural tendency toward obesity has been developed to the limit of abnormality in lard product, while the response to feed in growth of bone and muscle, as well as fat, enables the farmer to market his hogs at 250- to 300-pound weight at from ten to twelve months of age.

There has also been specialization in this development, as we may harvest either lard and pork, or bacon according as we sow in blood and feed. Needless to say, the stye and scavenger method of pork production in vogue about large cities deserves no mention as a form of swine husbandry.

It should not be concluded that a high degree of productive

efficiency has not already been attained by breeders of farm animals. Perhaps it is more to the point to emphasize the extent to which the cost of living has been kept from going higher through the agency of the animal factor than to encourage the belief that any material reduction may yet be accomplished by this means.

THE NEW OPTIMISM IN THE VIEWPOINT OF ECONOMISTS

By Roswell C. McCrea

Professor of Economics, and Dean of the Wharton School, University of Pennsylvania

When Adam Smith published the first edition of his "Wealth of Nations" in 1776, the tone of western thought was optimistic. The world in which we live was viewed as the best of possible worlds. God had done His work well. Shortcomings there were, but these were due to human interference with natural law, not to defects in the divine plan. Once nature were given free rein, once institutional pressure were removed, the perfectibility of man was regarded as merely a natural outcome of the gradual course of things. "Natural liberty," "the state of nature," "laissez faire" were current phrases reflecting the viewpoint of the time in political and social thought. Our own Declaration of Independence and the Bill of Rights in our Federal Constitution were products of this same hopeful attitude, conditioned upon the elimination of social interference with individual bent and natural tendencies. There was misery, squalor, vice in eighteenth century Europe, but these were regarded as unnecessary; and the cure was to be found not in any program of governmental intervention, but in the minimizing of governmental restraints and in increasing the scope of individual freedom and initiative. The repeal of government and law was regarded as the one expedient that would make possible the existence and permanence of a society, all the members of which should live in ease, happiness and comparative leisure.

Meanwhile, in England, where these ideas held sway among leaders of thought and opinion, the Industrial Revolution had gained irresistible momentum. At the beginning of the reign

of George III England was far behind other parts of western Europe in many aspects of civilization. Country life was isolated and stagnant. The towns were ill-built, unsanitary and ill-governed. Transport and travel were hardly better than in the later Roman Empire. The industrial arts were little developed; coal, iron and steel were known, but little used. Within two generations these conditions were transformed. A combination of surplus capital, surplus labor, new markets and a succession of inventions came together and wrought a radical transformation. Wealth increased by leaps and bounds; but the social harmony and diffusion of well-being that was the dream of the eighteenth century social philosophers failed to accompany this increase of wealth. The masses of the English people were in process of demoralization throughout the century. This arose from a number of diverse influences. Chief among these were changes in agriculture, which were driving laborers and small cultivators from the land, and accompanying changes in domestic industry. The enlargement of estates carried with it agricultural improvement; but this left its mark by drawing hard and fast lines of cleavage between the classes in rural society; even the smaller farmer succumbed in the struggle, and he was all the more to be pitied because the town laboring class into which he had been merged was entering on a terrible period of privation and degradation. Divorced from the land in consequence of the enclosure movement and from the old handicrafts because of the new machines, the mass of the workers could but cry with the sad hymn writer, "change and decay in all around I see," and bear the suffering they could not avoid. Poverty and riches were manufactured together. Anti-machine riots broke out, and the old criminal code was strained to do its worst by way of repression. Even the Poor Law became an engine of degradation. Allowances in aid of wages tended to depress the wage-rate it was their purpose to supplement. The masses were demoralized, and this demoralized population by rapid breeding intensified the influences that promoted its downward trend.

It was amid conditions such as these, when Godwin and his associates were proclaiming the fallibility of government and the perfectibility of man, that Thomas Malthus came forward with his famous thesis in explanation of human misery. A dogma to gain currency must be capable of tabloid statement; and Malthus did not hesitate to state the process of human evolution in terms of a mathematical formula, thus: Mankind tends to increase in geometrical, the means of subsistence only in arithmetical ratio; or, as he put it in later editions of his essay, Man tends to multiply more rapidly than the means of his subsistence. The checks upon this poverty-producing tendency were represented as: (1) positive, such as famine, war, pestilence, and (2) preventive or prudential checks, such as late marriage. Only in proportion as the latter influences were strong could the former fail to come into operation.

The Ricardian view that increase of food supply is subject to a law of diminishing returns buttressed the subsistence pillar of the Malthusian structure, and the resulting doctrinal combination afforded the pseudo-scientific foundation of a half century of economic reasoning. Adam Smith thought of Political Economy as the art of making nations wealthy and prosperous, rather than as a body of scientific principles explaining wealth and property. But beginning with the first quarter of the nineteenth century the subject began to be treated as an exact science. Ricardo's experience as a business man coupled with his talent for abstract reasoning enabled him to formulate the basal principles of the new science. James Mill's clear exposition and the refinements of analysis of Malthus and Senior brought statements of principle to a focus in the so-called classical or orthodox system of political economy. This body of thought, combining subtle reasoning with heroic abstraction from the complexities of life, has profoundly influenced the economic reasoning of the whole century past. And its foundation stones were the Malthusian doctrine of population and the Ricardian law of diminishing returns. Economic pessimism was the inevitable outcome. The kernel of this pessimistic

philosophy may be put thus in brief: The ills of mankind are due not to man's depravity nor to bad government, but to niggardliness of nature on the one hand and to man's prolific qualities as an animal on the other.

Practical applications of these theoretic tendencies are well illustrated by the wage theories of John Stuart Mill. Two supplementary doctrines were advanced by him. Over short periods wages were supposed to depend upon the proportion between the accumulated fund of capital and the number of wage earners. This wages-fund argument, roughly speaking, advanced the view that the general amount of social capital is determined by accumulated earnings and profits resulting from past exertions. Out of this sum a certain amount is required for plant and material, the amount being determined by the technical character of industry. The free balance is the wage fund, a fixed and predetermined amount. More than that amount the wage-earners cannot possibly receive; less than that amount they never obtain. The rate of wages, therefore, depends upon the number of wage-earners. Their number is the divisor, the wages fund the dividend. At this point comes in the Malthusian doctrine. If the number of wage-earners is great, their wages are low. Low wages check the increase of population; hence wages rise. There is, therefore, no use in blaming anybody or anything; one might as well blame the four fundamental rules of arithmetic. The question of wages is a question of division. If, however, the wage-earning population should so increase and wages so rise as to diminish profits, the accumulation of capital would thereby automatically be diminished, the wage fund would contract and wages would be bound to sink again. Neither unionism nor legislation can affect the situation—not even if, thereby, the efficiency of the wage-earners be increased and the profits of the capitalist class thus remain undiminished. As Sidney and Beatrice Webb have pointed out, this theory "left no room for any elevation of the wage-earners, even if the improvement justified itself by an increase in productive capacity. If one

section of the wage-earners succeeded, by peaceful negotiation or law, in so bettering their own conditions of employment as positively to increase their productive efficiency, this would still bring no greater reward to the class as a whole. Though the increase in the cost of their labor might soon be made up to their employers by its greater product, yet this increased drain on the wage fund must automatically have depressed the condition and so lowered the efficiency of other sections, with the result that, though the inequality between the sections would have increased, the aggregate efficiency of the wage-earners as a whole would not have risen. Thus every factory act which increased the immediate cost of woman or child labor had to be paid for by a contemporaneous decrease in somebody's wages; and every time a new expense for sanitation or precaution against accidents was imposed on the capitalists, some of the wage-earners had automatically to suffer a diminution of income."

Mill waxes eloquent in condemnation of any attempt to alleviate the condition of the masses by minimum wage regulation, by allowances in aid of wages or by a land allotment system. In his view the rate of wages which results from competition distributes the whole existing wages-fund among the whole laboring population; if law or public opinion succeeds in fixing wages above this rate, some laborers are kept out of employment. These must not be allowed to starve, so that they are provided for by a forced increase of the wages-fund, by compulsory saving. "If, under such an arrangement," says he, "those who have produced and accumulated are called upon to abstain from consuming until they have given food and clothing, not only to all who now exist, but to all whom these or their descendants may think fit to call into existence," such an obligation would suspend all checks on increase of numbers, both positive and preventive. Allowances in aid of wages as well as a land allotment system would have the same effect. Ignorance of these consequences, says Mill, is no longer pardonable. "To give profusely to the people, whether under the name

of charity or of employment, without placing them under such influences that prudential motives shall act powerfully upon them, is to lavish the means of benefiting mankind without attaining its object." The only escape from the vicious circle would in his view be through means that would act powerfully and directly on the minds and habits of the people. These means would have to act simultaneously upon the intelligence of the masses and upon their poverty. An effective national education of the children of the laboring class was, in his judgment, the first requisite to this end, and coincidently with this, a system of measures which should (as the Revolution did in France) extinguish extreme poverty for one whole generation. Toward this latter end the only feasible means would be a great national measure of colonization. This, by diminishing the number of the laboring masses, would raise the wage rate, yielding a state of tolerable comfort which might prevail until a new generation should grow up. Mill was convinced that small means do not produce even small effects. They produce no effect at all. Unless comfort could be made as habitual to a whole generation as indigence was, and could be accompanied by educational influences that would effect a marked uplift in intelligence and in efficiency, he was convinced that nothing could be accomplished. And his real expectation of accomplishment was not large. In the sixth edition of his "Political Economy," published in 1865, he says: "Whether this golden opportunity (growing out of increasing wealth and cheapened transport) will be properly used, depends on the wisdom of our councils; and whatever depends on that is always in a high degree precarious." Other classical economists were quite as frank and direct as Mill in acknowledging the misery of the working class, but there was little word of solace and no ray of hope for the toilers. Even as late as 1874 one of the last true blue representatives of classical political economy, Mr. Cairnes, had the admirable courage to state frankly and precisely his attitude. "The possibility of any improvement of the living conditions of the industrial laborers,"

said he, "is confined within narrow barriers which cannot be passed, and the problem of their elevation is hopeless. As a body they will not rise at all. A few, more energetic or more fortunate than the rest, will from time to time escape, as they do now, from the ranks of their fellows to the higher walks of industrial life; but the great majority will remain substantially where they are. The remuneration of labor as such, skilled or unskilled, can never rise much above its present level." This was not so much an expression of a personal opinion as a logical deduction from the classical wages-fund doctrine, of which Mr. Cairnes was the last vigorous champion. Thus any effort at direct alleviation of living and working conditions by legislation could be resisted on high intellectual grounds; according to the laws of political economy the reform would hurt the very class it sought to help. Thus we see a Harriet Martineau lamenting in 1833 over the first faint regulations of child labor. Shocked as she was by the official disclosures in regard to the subject, she could not tolerate any legislative interference, any social control; it was against political economy. But a woman's heart is not without mercy. She ventured the hope that children engaged in industry might die. "The case of those wretched factory children seems desperate; the only hope seems to be that the race will die out in two or three generations; by which time machinery may be found to do their work better than their miserable selves."

While Mill and his contemporaries were indulging in gloomy forebodings a vast change was already working out its effects in industrial and social life. The high productivity of industry was rapidly making vast accessions to the wealth of the western world, and population, although showing a marked growth from decade to decade, was increasing at a regularly diminishing rate. The consequence was a steady and significant per capita increase of economic goods. The western world had apparently entered a period of social surplus instead of the one of chronic deficit predicted and feared by the classical economists. Looking back over the past 150 years England, Russia,

Germany, France, Austria and Italy have multiplied enormously in population, but they have been increasing even more remarkably in the means of livelihood. For example, in Great Britain the national income rose from £27 per capita in 1867 to £40 per capita in 1901, a gain of nearly 50 per cent. As compared with the increase in population, the principal industries in the United Kingdom have similarly outstripped the increase in numbers in the past fifty years. The production of coal, relative to population, has increased from 2.62 tons to 6.07 tons; of pig iron, from 13.5 tons to 22.9 tons; of shipbuilding, from 9.72 tons to 23.52 tons; the consumption of raw cotton has increased from 28.1 pounds to 44.7 pounds, and of raw wool, from 10.40 pounds to 13.46 pounds.

Even more notable has been the development of the United States. With millions of acres of virgin soil, vast natural resources and a sturdy, energetic and inventive people, a marvelous development was to be anticipated and has been realized. During the first fifty years of the century, from 1800 to 1850, population increased from 5,308,383 to 23,191,876, or fourfold. For this period no serviceable figures of national production are available. But bearing in mind that it was the half century of internal improvement and railroad construction, of frontier extension and of industrial awakening, a conservative estimate might certainly assume that the increase of wealth at least kept pace with the growth in population, and that in 1850, just as in 1800, any poverty which may have existed in the United States is not to be explained by national dearth. From 1850, on, statistics of wealth production are obtainable, and rough comparison of the relative growth of population and income is possible. From 1850 to 1900 the population of the United States increased from 23,191,876 to 75,994,575, or 226 per cent. But in this same period the production of the eight great cereals increased from 871,000,000 to 4,434,000,000 bushels, or 409 per cent. What was true of increase in agricultural production obtained to an even greater extent with respect to economic goods in general, iron and steel, textiles

and general manufactures. The production of wool relative to population, increased from 2.26 pounds in 1850 to 3.79 pounds in 1900; of cotton, from .09 bales to 1.3 bales; of coal, from .27 tons to 3.16 tons; of pig iron, from .02 tons to .18 tons; of steel, from .0005 tons (in 1867) to .13 tons; of petroleum, from .66 gallons (in 1860) to 35.16 gallons; of manufactured products, from $43.94 to $150.10; of total exports and imports, from $13.70 to $29.53.

In recent years, material progress has been as remarkable. Between 1900 and 1910 the production of coal, relative to population, increased from 3.16 tons to 4.86 tons; of pig iron, from .18 to .28 tons; of crude petroleum, from 35.16 gallons to 95.39 gallons; of manufactured products, approximately from $150.10 to $224.76; of total exports and imports, from $29.53 to $35.90. The per capita production of the principal crops, it is true, underwent decline, being in 1909 a little more than nine-tenths of that in 1899. Some part of this was due to the extraordinary circumstance of deficient crops in the census years; but the essential explanation is that this decade saw foreshadowed the inevitable transition of the United States from an agricultural to a manufacturing society. Like England at the beginning of the nineteenth century and Germany in our own generation, the United States has found it relatively more profitable to apply labor and capital to manufacture than to agriculture, and to discharge some part of its foreign debits by exports of manufactured goods rather than of agricultural products.

Monetary estimates of national wealth are notoriously defective and misleading; but confined to a single country and computed for a term of years, they are serviceable for general economic comparison. The true value of all property in the United States—an aggregate materially less than that of "national wealth"—is estimated to have increased from $7,135,780,000 in 1850 to $107,104,212,000 in 1904, and to probably not less than $150,000,000,000 in 1913. In the same period, population increased from 23,191,876 in 1850 to 82,466,-

551 in 1904, and to probably not less than 97,163,330 in 1913. The per capita estimate would thus show an increase from $307 in 1850 to $1,318 in 1904 and to approximately $1,543 in 1913. In short, since 1850 the increase in property, so measured, has exceeded the growth of population as five to one.*

Economists could not long be blind to these tendencies. Indeed, Carey and Raymond, among American economic writers, early revolted against the dogmas of the classical school. But the English viewpoint was dominant at least until 1870. The logic of events, however, has been too powerful for the closet logic of backward-looking economic philosophy, so that among contemporary economists there are few who have not recognized the need of new economic principles and of new solutions of practical problems.

Poverty and distress still exist in acute forms, but with a constantly widening margin of surplus between individual want and social provision for want, so that we can no longer by way of explanation recur to the dogma of the English school. Economists are recognizing that poverty is an aspect of modern industry. Says Professor Hollander, an economist steeped in Ricardian doctrine: "The very forces which increase the national product and enlarge the social surplus, if left to themselves, breed conditions of want. As machine production becomes more intricate and operating speed more intense, the number of unavoidable accidents is likely to increase. As the subdivision of industrial processes grows more minute and the use of unskilled labor more practicable, the underpayment of unorganized or unorganizable workers becomes more common. As business competition waxes more acute and reserve funds of labor are found more economical, unemployment and under-employment become chronic. Industrial accident, parasitic employment, involuntary idleness are thus incidents of capitalism. Far from diminishing with increased wealth production, the misery resulting from such causes is, in face of social inaction, likely to augment and intensify.

* These statistical statements are taken from Hollander: "The Abolition of Poverty."

Society may grow richer, civilization may advance, and yet poverty continue to gnaw, cancer-like, at its vitals."

The large problem, then, is that of the use of surplus wealth in the removal of industrial evils and the promotion of social ends. The present European war may set us back fifty years in our advance toward a solution of these problems; but the problems will still be with us and the methods for solving them are gradually evolving. The desired end is the upbuilding of human powers. The means is not the realization of any revolutionary ism, but a detailed scientific analysis of conditions, followed by an equally detailed and courageous program of action. Working and living conditions must be improved; exploitation, which exists in individual and local phases, must be removed; educational and training facilities must be improved and extended, and the recreational life of the community must be guided and elevated.

There is substantial unanimity of attitude among economists as regards the more important aspects of these tasks. And none is more important than the labor aspect. In the first place, economists have become much more sympathetic toward labor organizations than they used to be. Instead of condemning them as useless or baneful, there is now a marked attitude of approval. Such organizations are regarded as quite essential to the working out of a fair wage bargain. When employers are large corporations, as is so commonly the case, it is plain that the worker stands little chance of getting a fair competitive wage unless he is one of a group prepared to meet organization with organization. The older conception of a competitive labor market in which isolated employers compete with one another for the services of competing wage-earners has been discarded. The present notion of a desirable labor situation is one in which honestly and intelligently directed labor organizations enter into collective bargains with honestly and intelligently directed employers' combinations.

The new generation of economists likewise approve of legislative and administrative control over the terms of the labor

contract. Reasonable laws regulating the working hours of women and children and prescribing standards of safety and sanitation for the benefit of all employees are universally approved by economists. The legal regulation of the hours of labor of adult men is less generally demanded, but the advocacy of measures of this type is steadily gaining headway. As the president of the American Association for Labor Legislation, one of our leading economists, has said: "The object and tendency of such laws, as economists now recognize, are not to repress individual initiative and enterprise, but rather to determine the plane on which initiative and enterprise shall act. Enterprise which spends itself in devising new methods for sweating the last ounce of productive power out of underpaid and ill-fed employees serves no useful purpose. It is much better that the same energy and ingenuity be directed toward introducing more efficient tools and machinery or a better division of labor, wage-earners meantime being protected from overwork under unwholesome conditions by definite legal prescriptions."

Besides approving the idea of labor organization and of protective labor laws, the economist now puts forward the further principle that wage-earners should be safeguarded against loss through accident or misfortune of the capacity to maintain the standards of living to which they have become accustomed. Among contingencies which often arise in the life of the wage-earner the most important are unemployment, sickness, accident, premature death and old age. Voluntary provision through trade union activity or through the beneficent enterprise of employing corporations often takes care of emergent situations such as these. The reliance of the classical economist was that every wage-earner should accumulate an independent fund of capital to guard against emergencies and old age. Such a development would be very desirable, but the progress made by wage-earners in this direction has been exceedingly slight. Nor is this socially the most intelligent and economical way to meet these contingencies to which all are liable, but which the great majority escape in whole or in

part. The socially expedient method would be that of insurance. In this way a common fund is created for the benefit of those who suffer, at a minimum of expense to the larger number of those who are exposed. Commercial insurance companies offer varied facilities for those who would insure; but the great drawback of such provision is that those who would benefit most are either indifferent to insurance or are unable to bear the expense of securing it. The only recourse under these circumstances would seem to be universal insurance at the expense of the wage-earners to be benefited, or of their employers, or of the state. Compulsory insurance schemes have been evolved and successfully operated in a number of countries covering various emergencies in the life of the wage-earners. Certain German and Swiss cities have experimented even with the difficult problem of insuring against losses due to unemployment. A number of our states have adopted a number of similar devices in the field of insurance, and the movement is likely to spread rapidly.

Details of this sort could be multiplied indefinitely if time would permit. But the point to be emphasized here is that these measures which would, to the classical economists, have seemed contrary to all principles of economics and sound statesmanship are now approved in substance by a growing majority of the newer generation of economists. The older arguments have been discredited by experience, and the results of many of the newer devices have shown how groundless were the old fears of paternalism, of pauperization and of subversion of the public order.

In reviewing the history of economic thought, economists have large cause for satisfaction. In economics, as a distinct discipline, there has been steady and marked scientific advance. Its influence on other fields of thought has been noteworthy, and the views of economists have been accepted as guides in business activity and in governmental action.

"But the chief reason for the economist's satisfaction is, after all, the change in his own attitude in reference to social

progress. The wages-fund theory and the Malthusian doctrine of population made economics seem a dismal science to the idealists of the first half of the nineteenth century. The theory of distribution that is now accepted and the practical measures which follow from it have changed economics into a science full of hopefulness for the future. Disagreeing still on some fundamental problems and on many of the practical applications of economics, the economists of today are nevertheless gradually coming to agreement. Moreover, out of the clash of their conflicting opinions a definite program of economic reform is emerging, which promises to make them as effective in promoting a broad and liberal policy of social betterment in the future as they have been in some periods of the past in sincerely, but mistakenly, opposing every departure from a strict laissez-faire policy. Economics still lacks the charm for the scientific mind that comes from precision of statement and exactness of reasoning from premises to conclusion, but no one need now be deterred from studying it from the fear that it deals with colorless abstraction or leads to a jaundiced view of life. It is intensely human in its interest, and the goal of progress toward which it points is as full of promise of well-being for mankind upon this earth as have been the dreams of poets or the aspirations of philosophers in any bygone age."

CINDERELLA IN ICELAND

By Clarence G. Child
Professor of the English Language, University of Pennsylvania

A grave, gentle and modest scholar named Jon Arnason died in Iceland in 1888. He was secretary to the bishop and librarian of the Cathedral library, the only public library in Iceland.

There is special reason why we should go to Iceland with its "crown of ice and heart of fire"—touching with its two northern capes the Arctic circle. Some five thousand miles less in area than Pennsylvania, one fourth at most is habitable, for its uppermost plateaus are desolate with the rigors of an Arctic winter even in summer. At the time Arnason went about his work, its people numbered perhaps 60,000, less than one four-hundredth of what Pennsylvania's population was then. At no time has the number risen above 100,000, even when not decimated for some time by cold, famine or pestilence. Just a thousand years of adventurous history and hard-bitten life lay back of Arnason's Iceland, since the island was settled by Norse nobles in the ninth century. Its isolation, its hard terms of existence, shaped an individual people. Despite its wide commerce abroad of war and trade, heroic conditions here lasted longest, surviving Christianity—nurturing men of aristocratic pride and native simplicity, at once fighters, farmers, traders, greater landholders and lesser, together with priests and bishops saintly and worldly, scholars and poets.

On a January day in 1852, Longfellow wrote in his journal, "Very cold: chilling body and soul. I sat by the fire wondering how the old Icelandic Scalds could sing at all. No wonder that their stricken faculties uttered themselves in such broken accents, such glacial metres, such abrupt and jagged songs!" Even Longfellow with his wide reading and generous sympathies

could hardly in 1852 have judged otherwise—but what a deal of water has run under Harvard bridge since then. There are critics not of Icelandic birth to affirm, with show of reason, that the literature of Iceland—its scaldic songs and its sagas—is the noblest early literature of Europe, save only that of Greece and Rome. Glory enough for this people so few on their tiny freehold—but Jon Arnason proved that the untended fallow, from which long ago that great literature sprang, which among every people contains the surest promise of future poetry, had not soured to barrenness. For thirty years he rode from end to end of Iceland, from nook to nook of its deep fjords, its windy headlands, by which the waves race as by a ship at sea, through its few warm meadows beside shining salmon rivers, up to remote cots so far as one might venture on the desolate upland, talking with men in the crofts, or leaning against the barrels of salt cod on the wharves, gentles, farm folk, fishermen, hunters, herdsmen—not unlettered, mind you, for they are so eager for schooling that scarce one cannot read or write, and yet they do not forget what schooling might kill—and so recorded the unwritten literature of the people. Of what he found, one may get some idea from the fact that two volumes were published in Leipzig in 1862, which contain 1,347 pages of close print—and this only a tithe of his immense collection, and that itself only a part of what might be gathered.

Think for a moment of what this collection means in its mere bulk and mass. There is no profit in comparing the folk-literature of one people with another, to exalt one over the other, if for no other reason than that no such record can be complete. But it is worth while understanding what folk-literature means. The Celtic folk-tales that are known are estimated at about 2,000. The great Finnish collection at Helsingfors is said to exceed 12,000. We should find, no doubt, like cause to marvel in Germany, France and Spain, in Russia, Persia, Egypt, India. But in tiny Iceland, so far away, with this immense collection of folk-myths before us, the wonder of the fecundity and vitality of folk-literature is borne in upon us—a

wonder like that one feels in thinking of the herring in the sea or the uncounted lives that lie, to persist or perish, in the seed-vessels of a single heavy-burdened stalk of mullein or of fox-glove.

If now we look into this great collection, we find much that is wholly Iceland's—for both individual beauty and a grimness and horror that curdles the blood go to the folk-tales of Iceland or Japan—but also here are many tales that are not Iceland's only. If in the courtly literature of a people, foreign works find a welcome, how much more easily and more numerously folk-tales that can travel swiftly as a song, and which are made at home and not even thought of as foreign, because of their primitive humanity and poetry. The story of Charlemagne—the Karlemagnus saga—the story of Troy or Alexander, while welcome, could not help but remain exotic to Icelandic hearers. Not so the world-wide story of Cinderella. Let us take the Icelandic version of this tale from Arnason, with its characteristic touch of the grim and bizarre, its free admission of modern fact, showing how truly oral tradition, a free understanding between speaker and hearer, is still alive.

The story is the story of Mjādveig, daughter of King Mani. Mjādveig is Cinderella, for Cinderella is known by many names in different lands. King Mani, happy in his lovely queen and lovely daughter, loses his queen and falls into such deep sorrow that all things in his realm go astray and even his beautiful daughter, Mjādveig, cannot comfort him. His councillors advise him to remarry, and two are sent to find him a new queen. They travel far and come through fog and storm to a wild country where no houses are—but, as they wander there, they hear a harp played so magically that nothing was ever like it for beauty and for strangeness. The sound comes from a little tent of woven silk, and here they find a lady, a queen she tells them, who has dwelt here with her daughter since that land was harried by invaders. She is fair to all seeming, but really both she and her daughter are evil, monstrous trolls in disguise. Her beauty and her harp-playing at once win Mani from his grief, and for a time all goes well.

But one day she and her daughter take Mjādveig to walk, and in a lonely place the queen makes Mjādveig change dresses with her daughter. All that remains to her of her own are her golden shoes. They bind her and leave her. The troll-queen's daughter is made by enchantment to look like her, and in the palace takes her place in Mjādveig's bower. The tiring-women cannot understand what change has come over the temper of their sweet and gentle mistress.

Meanwhile, Mjādveig lies bound and helpless in that secret place. To her, in her dreams, comes her dead mother, frees her from her bonds, bids her stay where she is, and gives her a kerchief with food within it. She must not eat all, and the kerchief will never be empty. Her stepsister comes, pretending to condole with her, but really to spy upon her, sees her take the kerchief and eat, snatches if from her and runs away.

Again her mother comes to her in her dreams, tells her she has been too trustful, and bids her go down to the sea, where she shall find a tongue of land reaching out into the waves. There she will find a small house, locked, but with the key standing in the door: "Three times forward, and three times backward shalt thou go about the house, touching the key each time, and the door will open. There dwell, and you shall not weary, for there

> Cuckoos sing
> Onions spring
> The wethers lose their covering."

So did Mjādveig, and she did not become weary, but one day, at the shore, she saw a great fleet of ships slanting in on a free wind to harborage. The ship at the head is just rounding to anchor, and she turns and flees, dropping a golden shoe. The prince in the ship had come to woo King Mani's daughter. He sees the fleeting figure, picks up the golden shoe, and vows to marry none but her whose foot it fitted. He tells his vow at Mani's palace. "Yes," says the queen. "How good of you to find it! It is my daughter's—she lost it out walking—children are so careless." The queen takes it to her daughter. It will

not fit, and the queen cuts off her daughter's toes and heel and forces it on. The prince and his bride go down to the ship, but as they pass near Mjādveig's home, he hears the birds singing

> Heel chopped-off sits in the stern
> And full of blood is her shoe.
> Here on the sea-strand
> Mjadveig's home doth stand,
> A far better bride to woo.
> Turn back, then, King's son, turn back!

The prince cannot believe what he hears, but it proves to be even so. And what is more, he has with him a magic plate that, placed between the shoulders, dissolves all spells. He puts it between the bride's shoulders and she becomes what she really is—a monstrous, ill-shapen troll.

One must make short shrift with trolls!

He kills her, salts her flesh, twelve barrels full, and places the barrels on a ship laden with gunpowder.

Then he rows ashore, and finds the little house. He walks about it and cannot get in till the birds tell him the magic way. Once within, he finds a princess of wondrous beauty, and he takes the golden shoe from his pocket and it fits. And she has another just like it.

He hears, of course, the whole story of her stepmother's cruelty. What shall he do? He sails away with his fleet, and leaves Mjādveig in a safe place. Then he returns to bid Mani and the wicked troll-queen to visit his kingdom. They are willing, and embark with him on the ship laden with gunpowder. The troll-queen grows sullen, she is not well, the sea disagrees with her, and she refuses food till the prince offers her the salted meat, which she eats day after day, turning into her own likeness as a hideous troll. On the twelfth day, at the last barrel, the prince takes the king where he can see her, hideous troll that she is. As she feeds, they set fire to the ship, go ashore, and she is blown up with the gunpowder.

An island, sparsely populated, on the rim of the Arctic sea has shown us the vitality of folk-literature even to within reach

of our own day. This theme of Cinderella may show us the marvel of the threads that connect folk-literature about the world. The story you and I know best came from Perrault, from whence also come "Puss in Boots," "Little Red Riding Hood," "Bluebeard," and "Sleeping Beauty." Perrault no doubt may have borrowed some of his tales from the Italian, but he also collaborated with his ten-year old son, who wrote down tales his nurse and, perhaps, other peasant women told him. Perrault's tales are called "Tales of My Mother Goose." The name "Mother Goose" really goes far back of him. It is often said that our "Mother Goose" was a Mrs. Goose of Boston, whose nursery songs her son-in-law Thomas Fleet published. That is a mistake. Mother Goose did not come from Boston; quite probably she was really the mother of Charlemagne.

It is not because of its secondary life in a stage above folk-literature, due to Perrault, that this story may be chosen. Many another might serve as well, from the merely scientific standpoint—but this story at once satisfies scientific purposes and engages as well the mystic that underlies every true student. Not a few have worked upon it—but of all the patient labor that has helped, what counts for most is the abstract, by Miss Marian Coxe, of 345 versions of the story, collected from Europe, Asia, Africa, America, with omission of such as are artificially "literary"—and yet the collection is acknowledged to be incomplete. Indeed, it is not impossible, but rather probable, that with a devotion and patience like hers, one might collect two score, perhaps a hundred, more.

The story behind all these versions is this. Cinderella is persecuted by her stepmother, stepsisters, or her father, she lives in lowly service at home, or herself flees from home to lowly service—in either case, meanly clad, her beauty is in disguise. By supernatural aid—her dead mother, a helpful beast, rarely and only later a fairy godmother—she throws off her mean disguise and appears in raiment that befits her beauty. So appearing, in church, at a ball, in the garden of the palace

where she is a servant, she escapes once, twice, from her high-born suitor, but sooner or later, by means of her shoe or some other token, is found and captured by her lover.

These elements appear in endless combinations, with every possible degree of emphasis and variety of development, with indescribably strange and quaint changes of detail. The immortal rats and mice and pumpkins of our version are no doubt due to the nurse of Perrault's ten-year-old boy or some other mute inglorious peasant poetess who never dreamed but what poetry and humor could go together.

Take one or two examples that lie near our own Cinderella. Cinderella appears in all her beauty at church. Twice she escapes, throwing pepper in the eyes of the prince's soldiers or money on the ground for them to scramble after; the last time her shoe is stuck fast to the porch, which has been smeared with pitch or honey after she entered. Or take her glorious raiment. Cinderella has two or three changes of dress to appear in, given her at the moment or treasured by her in nut-shells—a dress with the sun, moon and stars upon it, a dress with the sea and fishes upon it—or in a Sardinian version, a moon dress, a star dress, a dress covered with chimes, in which last she climbs each night a tree before the palace where she serves, and no one can tell where the magic music of the chimes comes from. Into many of the stories enter tasks like those in Cupid and Psyche. Notably as a primitive feature, found also in many other groups of tales, enters the helpful beast, which serves as Cinderella's familiar and friend. Whatever the helpful beast may have been in the past, he survives no doubt in the folk-tales as the dog or horse or other animal in whom one reposes trust when the world seems none too kindly a place.

We may take this element of the helpful beast to show the wide range, the common appeal, of these tales. In a Scotch version, little Cinderella is set to watch the sheep, and given only a thimbleful of broth, a grain of barley, thread of meat and crumb of bread for her dinner. A little black lamb asks her why she cries, and at his bidding from one of his ears she pulls

a piece of cheese, from the other a great slice of bread. Her stepmother has the little lamb killed. A little old woman bids her gather up all the bones, which she does, all but one shank bone. The next day she is to cook dinner while the rest go to church. The little black lamb comes to her limping, because one shank bone is missing. It cooks dinner, while she puts on her best dress and goes like her sisters to church. Twice this happens—the third time she drops her shoe. Then the prince comes, and the stepsister chops off her toe and heel and is riding away behind the prince when a raven in the tree sings:

> Hacket-heels and hewed off toes,
> Behind the young prince rides;
> But pretty foot and bonnie foot
> Behind the cauldron bides.

And so all goes well.

Go from Scotland to Armenia. Little Cinderella's brother has been changed to a ram. Her stepmother means to have him killed, but the little girl takes him to a mountain meadow, where she sits and spins. Her spindle falls and rolls through a crevice into a cave where a thousand-year-old Deva, a hideous witch-giant, is lying. With her modesty and sweetness she wins the Deva's liking. The Deva wishes to sleep and puts the fire-hook in the fire; "If Darkness passes, do not wake me, but if Rainbow-hued goes by, put the fire-hook to my feet, for I sleep hard." By and by a hideous dark monster passes by the cave, and Cinderella remains still. Then comes Rainbow-hued—there is no mistaking her—and she puts the white-hot fire-hook to the Deva's feet, who groans "My, how the fleas bite!" and wakes up. Then Cinderella goes home. The passing of Rainbow-hued has turned her hair and clothes and shoes to gold. Dress and shoes she hides, but her stepmother sees the golden hair and forces the story from her. She sends her own daughter to the mountain. No sweetness and modesty about her! The Deva turns her to a scarecrow. But even a scarecrow can be tricked up to pass muster, and her mother puts all her finery upon her and

takes her to the king's palace. After they have left, Cinderella puts on her gold dress and shoes and goes too. Hurrying home, she drops one of her gold shoes in a spring. The king's horses, going to be watered, will not drink, starting back from the radiance of the golden shoe. "Whoever can wear this shoe," says the king, "the prince shall wed." The messengers come to the house and the stepsister tries to push on the shoe, but the cock flies in over the threshold and crows three times, "Kikeriki, the fairest of the fair sits in the stove." Not in the golden shoes alone, but in her golden dress, Cinderella goes to the palace.

Scotland and Armenia—but now, instead of this golden Cinderella and her fine raiment, see how the mean array she wears before the prince comes may become a chief element as the shield and protection of her beauty. Persecuted at home, Cinderella flees in a disguise of pigskin, goat's skin, ass's skin or bearskin. In a Neapolitan version, she flees away disguised as a bear, into which she turns when she puts in her mouth a chip of wood given her by a little old woman. She lives in a forest, and one day the King of Swiftwater comes by. She fawns upon him and he takes her home and loves her dearly. One day in the garden she takes out the chip, and, as her natural self, sits combing her golden hair. He sees the lovely lady from the window and rushes to the garden—but finds only his little bear. He falls ill of love and lies in his room, calling for his little bear, and his mother is about to have the bear killed, thinking her the cause of his illness, when he jumps from his bed, searches for her and brings her to his room. He cannot be well unless she nurses him. His mother thinks him mad, but has to agree, and the little bear feels his pulse with her paw, smooths his pillow, makes chicken broth for him and picks a nosegay of roses and lemon-flower for his pillow. More deeply in love than ever, he says he must kiss the little bear or die. The mother pleads with her to let him do this, and so the little bear goes near, and, as he kisses her, the chip falls from her mouth, and behold, the lovely lady of the garden is his.

Most striking among these versions are those in which the

disguise is not beast-skin, but wood. In a number of Norse versions, Cinderella is called Katy Wooden-skirt, for she has only a wooden petticoat to wear. All over Europe the wooden dress or disguise reappears—even to a complete figure of wood in which she is enclosed, whence the French version called the "Mannequin." Always, be it noted, the disguise is to guard her beauty. In a Sardinian version—Maria Intaulata, "Wainscoated Maria," the Prince beseeches her in vain to throw off her disguise, and, finally, in despair, draws his dagger, cleaves at a thrust the insensible wood, and clasps the glowing princess within in triumph. Leave Norway, France and Sardinia, and pass to far-off Japan. A family have become wretchedly poor. The mother on her death-bed, fearful because of the great beauty of her daughter, turns over her head a wooden bowl that comes down to her shoulders. The girl works in the fields, then as nurse in a great household, and is much loved for her sweetness, modesty and industry. Her master's princely son comes home from the Mikado's palace, and at first is inclined to joke when he sees the "wooden bowl girl," as she is called. But he peeps one day under the edge of the bowl, and from that day will marry none but her. The parents are forced to consent. The girl herself will not yield till her dead mother comes to her in a dream. They try to make her take off the bowl, but she cannot. Only, as she takes the cup to drink, in the marriage ceremony, the bowl bursts and they find it encrusted within with gems—though these count for little beside her transcendent beauty.

Here, then, are illustrations of the two main variants of the story—and we have fetched traverses from Scotland to Armenia, from Norway to France and thence to Japan. What the relation may be between Katy Wooden-skirt and the wooden bowl girl need not concern us—whether with one school one regards such parallels as pure chance, due to similarities of primitive custom, or with another believes such stories to have spread east and west from India, a great storehouse of stories as it certainly was. Both theories are no doubt sound. It is really enough simply

to pose ourselves with the marvel. In any case, who was Cinderella, the real original Cinderella? A nature myth? Guardian of the hearth, certainly, we are told, as the youngest daughter. It would be a beautiful explanation, if it could be true, that Cinderella was the evening aurora, Ahalya, the opposite of the dawn, sitting among the ashes of the dying west. Whence, then, would come her shoe? Your myth-maker explains that it comes from *apad*, "footless," turned over to another possible meaning, namely, "that which measures the foot," the footprint or the slipper. If that were true, which it doubtless is not, the story of Cinderella would twice have been affected by an unconscious pun. For Perrault's Cinderella, our Cinderella, wears glass slippers, either because of a glass-cloth fashionable in seventeenth century France, or because, as is generally believed, he mistook as slippers of *verre* glass, what really were slippers of *vair*, an old mediæval word, that is, slippers of fur—very much more comfortable, one would think, to dance in at the ball. Or, if you like, you may believe that the story started in Egypt—a notion that has attained some currency because the geographer Strabo heard how an eagle caught up a sandal when its owner was bathing, and flying over Memphis dropped it into the king's lap, who searched out the lovely lady and made her his wife. The names of an Egyptian queen and of Rhodopis, a friend of Sappho, are beautifully mixed up in this tale—attempts, no doubt, to localize a myth far older than either.

We certainly cannot as yet, if ever, search out the real Cinderella. Failing this, we may note that this story has not, like many another folk-tale, achieved greatness. Only in certain elements may you see it in works of some importance—the beautiful German romance, King Rother, or the French Mannequin, or as remotely connected with great sagas such as that of Constance and its analogues. It is a story that, so to speak, has never grown up. Within our stretch of history it has been poetized and moralized only so far as to become a simple tale

of beauty and innocent worth for a time in eclipse, later to find its merited apotheosis.

But this is sure—that when one looks into a huge collection like that of Arnason's or others like it, one is purged of a little of one's narrowness and smallness. Condescension or amused curiosity are purged away when one reads on in this literature—though it is not great literature and is not cast into modes we have been schooled to accept. So much is strange and bizarre, even barbarous, that only after a while one realizes that this teeming vitality means old faiths and ideals and superstitions shaped into concrete images of poetry and humor and horror, the essential reality from which great literature may spring. And that means much if one holds fast to one's faith in the truth that the integrity of a people depends upon its poetry and philosophy, its way of facing life for ideal ends, in place of the bartering of those ideals, or their surrender, for bread. And when you follow this or that tale through one literature after another, where chance-blown spores have lodged it to spread out its tangled network of affiliations, it is very much as when you turn back the pasture sod or the forest floor, where earth, leaf-mould, dead grass-roots, ordure, crumble and blend, loosing delicate, searching scents, aromatic and pungent, and see the white threads of mycelium in their tangled network, whence shall bud shapes, clumsy, monstrous or exquisite, brown, tawny-hued, purple, splashed with orange or crimson. Somehow—when you see this—you have a more quick and intimate sense of the miracle of life and death and reproduction than when you look on the familiar trees in their pride, whose roots lay such large hold upon the earth.

Why should we, even unconsciously, patronize and condescend? Simply because we, unconsciously, assume a distinction between great literature and literature relatively worth little or worthless. That is not a very useful distinction. Literature, worth little or worthless, may be left out of account; let oblivion take care of it. The sound distinction is between great literature, possessing intrinsic worth and vitality, and lesser litera-

ture, which is just as truly literature, if it also possess lasting worth and vitality. It is perfectly proper to exalt great literature—but its exaltation may lead to the fatal fallacy of comparison. This is so great, therefore that is valueless; this is of an accepted mode, therefore that is beyond the pale. You remember how for so long all that was worth while was classic, all else—the literature of the north—was Gothic and barbarian. Now, in the present instance, all the associations of folk-literature are humble—for us, in its most gracious form, it means the nursery and the fireside—and when we study it in its fullest and most complete record, it is, save in the ballad, chaotic, formless, inarticulate. We do not rightly realize and keep in mind the relation that links together great literature and folk-literature. The critic is blind to it, or leaves it out of account continually—as, for example, when he speaks of a "trivial folk-theme," a "commonplace folk-theme," a "childish folk-tale," "the justification of the fairy-tale is the inculcation of a moral." He needs the admonition that came to St. Paul. For it is worth remembering, not as a dry, scientific fact, that all great literatures came from folk-literatures. We certainly do not keep that fact in mind—is it not a shock, each time that one recalls it, to realize that the Iliad and the Odyssey and the Medea and the Alcestis and the Œdipus go back to folk-tales? Indeed, more—if one can possibly set aside for a moment all that the Greeks made of them—these folk-tales, hero-myths and nature myths, were in no wise different, originally, from the myths of north or south or east or west.

One falters before such a notion: "But the classic myths are so beautiful." Yes—they are beautiful, because the Greeks began consciously to rationalize and poetize their myths three hundred years before Christ. Moreover, even the simplest of them, met with in literature where alone we are apt to meet them, come to us told with the consummate artistry of an Ovid. And those we meet with and are apt to know and remember are only the selected and transformed few. We do not meet with or we forget the countless primitive crudities and

barbarisms. Look into any of the systematic classical mythologies of classical times or the Renaissance, even the text-books used today in our schools, and you shall find stories as bizarre and grotesque as anything in Celtic or Teutonic or Finnish or Indian or Japanese myth.

"But"—again one objects—"see what the Greeks made of certain of their myths in epic and tragedy." Most truly the Greeks did make great literature of their myths. But have not folk-myths elsewhere, perfected by tradition and the genius of the individual poet, become great literature—Siegemund and Signy, Siegfried, Beowulf, the Sagas (all the more wonderful as translating so speedily the homely stuff of country-side, historic tradition into great literature), Charlemagne, Arthur, Tristan and Iseult, Hamlet, Lear, Macbeth?

Again, one hesitates and objects, "I cannot see that the Greeks' starting earlier really has anything to do with it. Does that in the least explain or minimize the swiftness and certainty and intrinsic quality of their achievement? Well, then, if you fix your attention on the fact that the starting-point was the same, does not this the more conclusively prove their wonderful achievement to be all the more transcendent?"

This seems at first sight a question very much to the point, and the argument it contains unanswerable. But, if one looks into it a moment, one finds that it either means nothing or else something else than what it appears to mean. No one denies the transcendent nature of the Greek's achievement. What we are really asking, by implication, is, whether classic literature is not greater than any other, and, if so, must we not grant it peremptory authority and ascendency? We really have at the back of our minds the old arrogant assumption, today still an obsession, of an essential difference in quality between the Greek and the Gothic imagination. To get at the truth, it is not of the slightest use to compare classic literature and later literature—the Greek and the Elizabethan tragedy, for example, could we separate from the latter what could be proved to belong to classic tutelage. That sort of thing is futile and leads

nowhere. Rather we should examine into the nature of the peremptory right of classic literature because of its greatness. And here the first step to a correct conclusion is to remember that we are not arguing about the true Greek—he has no quarrel with us, or we with him—but about a Greek of our own invention during the past three centuries. Hear how this latter-day Greek could talk some sixty years ago.

Nathaniel Hawthorne, in the person of the "feather-brained" student, Eustace Bright, had been telling tales to the children of Tanglewood—Primrose, Sweet Fern, Clover, Huckleberry, Buttercup and the rest. Mr. Pringle desired to know how Eustace had produced so great a sensation among the little public of Tanglewood by this gift of narration. He addressed Eustace, you will remember, "benignly enough, but in a way that made him feel how uncombed and unbrushed he was, and how uncombed and unbrushed, likewise, were his mind and thoughts." Eustace is abashed by his manner, but summons enough boldness to say that sympathy should be among a critic's qualifications, and, snatching the first theme that presented itself, suggested by a plate on the mantelshelf, tells the story of the "Three Golden Apples." When he has finished and the enraptured questions of the children are over—for he has made the story near, and human, and delightful—Mr. Pringle says, after some deliberation: "I find it impossible to express such an opinion of this story, as will be likely to gratify, in the smallest degree, your pride of authorship. Pray, let me advise you never more to meddle with a classical myth. Your imagination is altogether Gothic, and will inevitably Gothicize everything you touch. The effect is like bedaubing a marble statue with paint." And Eustace replies that the old Greeks had no more exclusive right to their myths than a modern Yankee has; "they are the common property of the world and of all time."

That was true as Hawthorne meant it in 1851, but it also involves a wider range of truth than was seen in his day. If we want to put ourselves in proper relation to the old Greek, not to Mr. Pringle, note that this humble literature we have been

considering, with its inarticulate poetry, has not only given birth to the great classic literatures of the past; it can be and still is the only sure starting-point of new vitalities and realities in poetry.

Start with today and count back. How much does the Celtic Renaissance owe to it? Was it not the folk-tales collected by Asbjörnsen and Moe that created modern Norwegian literature? What part did English balladry and her own folk-lore play in the Romantic Revival in Germany? And how about the English Romantic Revival? And in the sixteenth century, when England's national spirit again found itself, accepting and rejecting freely of substance and form, did not the best of her literature proceed from her own legendary lore? Moreover—though no one thinks of it—this is no modern matter. What about the use of the stories of King Arthur in the twelfth century? When Geoffrey of Monmouth for his own purposes, whether to exalt his people or to glorify Henry II, used and changed and added to those stories, do you suppose he was anything else than a self-conscious literary workman who knew perfectly well what he was about? Or consider two of the truest poets of that time—Chretien de Troyes, whose influence beats in your pulse today, and Marie de France, finer artist but less sensible to the world's recognition—when they turned to Arthur and to Celtic legend, do you suppose they were merely gifted children, unconsciously perfecting the half-perfected? Not a bit of it. They were conscious artists, taking what was akin to their genius and needs—why else should Marie tell us she had thought of writing of Greece and Rome, but as so many were writing of that, she would turn to legends of the people?

Now if it is true, as it is true, that this tremendous debt is owed to folk-literature, that today and in the past and in the future, it can and has and will yet again renew poetry, wherein lies the secret—so inchoate is it, so formless, save in the ballad whose complex is today inimitable, containing so much that is grotesque, bizarre, unfit, so far from what is adjudged of fixed

and stable worth, immutable canons, rigid creeds, and the divine right of those ancient, long-ago anointed kings of song? Wherein lies the secret? It is not merely that this literature of the folk is instinct with the life of the country or race to which the poet belongs, for its influence can cross political and racial boundaries. There is a more fundamental reason, as basic as it is simple. Look back again to the twelfth century. You find there one group of poets turning to the great stories of Thebes and Troy and Rome, another turning to Celtic legends. The vital concern of both is the same: to frame in magical terms of the imagination the most beautiful thing in the world—chivalric deeds and the code of chivalric love. But how strange, how ludicrous, is the way Benoit and his fellows treated the classic themes—not because they did not have Homer, as they certainly had Statius and Vergil. How could they be so anachronistic, so bizarre, so "Gothic"? The critics say, "Oh, yes—it does seem strange and most amusing, but you must remember the medieval poet had no historic sense. His mind was like the mind of a child—past and present were all one to him—there was no middle distance."

Quite so—but subject to one or two not unimportant modifications. In the first place, the fact thus stated ought not to be used to explain what seems bizarre in the medieval poet's manner of looking at things, but most assuredly to explain why it was that he did what he did so well. And in the second place, what is of far greater significance, the fact alleged true of the medieval poet is not true of him alone, but is a necessary condition of the existence of a truly creative poet in every age. For the true poet, in the act of creation, time is dateless, even as he humanly is fulfilling the office of maker, shaper, creator. The historic sense is not a starting-point or essential, of creation, but a later bond and shackle when his vision must be mediated to his hearer, a man than himself less free.

There were many and heavy bonds upon the human spirit in the twelfth century—in large part other than those of today. But the poets of that time, escaping from them, went equally

to the story of Troy, or the story of Arthur, free men. When with later centuries came wider freedom, the study of the classics was surely result rather than cause. Then were men to find freedom or a new slavery? Chaucer at school in France and Italy was not else than free. Spenser in Italy was free. Milton, fusing together the sublimities of Hebrew poetry with the imperishable perfection of classic symbols in the Renaissance resolvent of pure beauty, even though he served the interests of Puritan theology, was still free. Chapman, translating Homer, gave not Homer but himself, and in so doing gave Homer more truly. William Morris made no mock-epic out of Jason, while unifying classic themes, the medieval spirit, and the nineteenth century. And did not Hawthorne, back in 1851, know he must approach the beautiful classic myths as a free man or not at all? Or see how the truth works itself out in little ironies. Perrault's pretentious works, written slavishly to a pattern, are dead; he lives only in his fairy tales. Robert Southey's grandiose epics, which were to be imperishable, are forgotten, but his "Story of the Three Bears" will never be forgotten.

We all know that true humanism, the study of the past, meant freedom. But it also might bring with it slavery. We hardly realize this when we see Racine, a partly fettered immortal—or indeed when we hear Corneille, a rebellious Titan, grumbling under the burden of false classicism. But what can one say when one views the long stretches of barrenness and futility in the literatures of England and Germany in the eighteenth century? Hardly do you have humanism in the world before her gracious presence is dogged and shadowed by the pedant and the dogmatic critic, old tyranny in a new disguise.

The simple secret, then, is this: The true poet, in whose vision past and present are fused, is no more oblivious of the great literature of the past than he is of the beauty and the pain in the world about him. What he does abhor is empty beliefs and outworn formulas that would coerce him. Therefore, he has turned and will still turn to this humbler literature, whose very

vitality consists in this that it fuses past and present into one. These stories, immemorially old, are also immortally young. They are not subject to the conventions of the schools, the pedant's prescriptions. Here simple things have their true values and are touchstones to the false values of the day. Here, too, old heroes sleep and truths the folk have drawn from earth and sea and sky. Then have we not here the answer to our question? Who would not go to school to the Greek, even as he unbidden went to school? But if the Greek himself lived today, would he not himself bid us be free?

THE PANAMA CANAL AND ITS PROBLEMS

By Emory R. Johnson

Professor of Transportation and Commerce, University of Pennsylvania

The Panama Canal was opened for traffic on the 15th of last August and has now been in operation nearly seven months. The commission that had charge of its construction was relieved of duty April 1, 1914, about one year ago, when the work of completing the construction and of inaugurating the administrative organization for operating the canal was turned over to Colonel, now Major General, George W. Goethals, the present Governor of the Panama Canal.

The construction work is in reality still in progress on a large scale. At the end of 1914 there were 21,500 laborers employed on canal work, and 3,600 employees on the Panama Railroad, making a total force of over 25,000 government employees on the Isthmus of Panama. This is more than half the number employed when the canal construction work was at its maximum. The present large force greatly exceeds the number that will be required for the permanent operating personnel, and is made up mainly of men engaged in the construction of terminals at Cristobal and Balboa, in erecting buildings, in municipal engineering work, in the machine shops, in dredging and in the construction of fortifications. As the different parts of the work are completed this force will be reduced, but it will probably be at least a year before the force is reduced to the numbers that will be required permanently for the operation of the canal and the railroad.

The construction of the Panama Canal has appealed strongly to the imagination of every American. The heroic but unsuccessful efforts of the French company to carry through the work, the subsequent undertaking of the great task by the Government of the United States, and the signal success achieved

by our country in the execution of the project have given to the story of the canal all the fascination of romance; but the questions of enduring interest, however, are not how the canal was built but why it was constructed and how it shall be managed.

In these troublous days of unprecedented warfare the canal is probably thought of first with reference to its value to the American navy. The Panama Canal has frequently been declared to be a commercial convenience and a military necessity for the people of the United States.* This is such a generalization as would naturally be made by the military expert and by those statesmen and publicists who place great emphasis upon the enhancement of the military power and naval prestige of the United States. This is not the point of view of business men and of the public generally; they regard the canal as a highway constructed to reduce the expenses and risks of commerce, to make possible the expansion of industry, and to enlarge the profitable employment of labor.

It is for peaceful purposes rather than for military uses that the canal has been built. The American people have not been animated mainly by military ambitions in the work they have done at Panama; their primary object has been to promote their domestic trade and to remove the handicap under which they now compete with the people of Europe for the vast commerce of the Pacific.

Nevertheless, the Panama Canal will be a valuable and most welcome military asset. The United States is a world power fronting the Atlantic and Pacific, upon both of which oceans it must maintain an efficient naval force. Until the canal was opened the fleets that defended our eastern and western seaboards and held the aegis of their protection over our foreign trade were 13,000 miles apart; they could not support each other; each had to be strong enough to do its own work and to fight, unaided, its own battles.

* This and the five following paragraphs are taken from a paper by the author that appeared in *Scribner's Magazine*, July, 1913.

The Panama Canal has brought the Atlantic and Pacific squadrons of the American navy closer to each other, and thus greatly increased the mobility of the fleets; and it will accomplish much more than this. The strong fortifications guarding the canal at the entrances will also protect coaling stations, docks and machine shops. The Canal Zone is thus made a secure and well-equipped naval base at which fleets may be assembled, from which a squadron may go forth to strike a blow, and to which it may confidently return for coal, supplies and necessary repairs. The canal will thus practically unite the Atlantic and Pacific fleets.

Naval experts have said that the canal will double the efficiency of the American navy. This may be an exaggeration, but it would seem to be a roughly accurate generalization. Of course, one hardly needs to be a military expert to realize of what strategic value it will be to the United States to have strong fortifications and a secure naval base at the sole gateway between the Atlantic and Pacific.

By the Hay-Pauncefote Treaty, as first drafted, the United States was not to fortify the canal, and the promise was made to Great Britain that treaties neutralizing the canal would be entered into with other nations. The Senate wisely took these provisions out of the proposed treaty, and the convention that was subsequently negotiated and ratified contained no reference to fortifications. The existing Hay-Pauncefote Treaty stipulates that "the canal shall be free and open to the vessels of commerce and war of all nations"; but the United States is the sole guarantor of the neutral use of the waterway by the vessels of all nations upon terms of entire equality. The United States is free to take full advantage of the canal as a military asset, and it is wisely proceeding with the erection of fortifications and the construction of coaling stations, dry docks and repair shops.

The Panama Canal has been constructed to shorten the length and time of ocean voyages between the two seaboards of the United States and generally between the countries of

the North Atlantic and those of the North and South Pacific. The maximum effect upon ocean distances will be the reduction in the length and time of voyages between the Atlantic-Gulf seaboard of the United States and the Pacific coast of Canada, the United States and South America. The trip between New York and San Francisco, the typical Atlantic and Pacific ports of the United States, can be made through the canal by a freight steamer in nineteen days, whereas the trip by way of the Straits of Magellan would require fifty to fifty-two days. A sixteen-knot passenger steamer can make the run from New York to San Francisco, including the necessary stop at the canal, in fifteen days. The time required by freight vessels for trips between the Atlantic seaboard of the United States and western South America has been reduced three weeks. A trip from New York to the Orient is shortened for freight vessels by two weeks.

The reduction in the cost of transportation, due to the opening of the canal, will vary with different commercial sections of the world, the saving in distance being greatest for the commerce between the two seaboards of North America. It should be noted in passing that the reduction in the cost of transportation via the canal will result not only from shortening distances, but also from cheaper fuel expenses and from the increased service obtainable from a fleet of vessels.

Prior to the opening of the canal the traffic handled coastwise between the two seaboards of the United States moved by the Isthmuses of Tehuantepec and Panama, where the commodities had to be handled twice and transported by rail from ocean to ocean. The cost of transferring freight across the Isthmus from vessel to vessel was about one-third of the cost of shipment between the two seaboards of the United States. For a number of years, the American-Hawaiian Steamship Company transported a relatively large tonnage of commodities between the two seaboards of the United States via the Isthmus of Tehuantepec. The steamship company paid one-third of the through rate between New York and San

Francisco to the Mexican National Railway for transferring the cargo from the ship in one ocean to the ship in the other. The amount paid the Mexican National Railway averaged about $3.50 per ton of 2,000 pounds.

For more than half a century traffic was shipped via the Isthmus of Panama, where a double transfer of traffic and a rail haul were necessary. During recent years the average cost of transferring cargo from steamer to steamer across the Isthmus of Panama has been about $3 per ton. Thus the piercing of the Isthmus will save from $3 to $3.50 per ton in cost of transporting traffic between the two seaboards of the United States.

This, of course, does not include all the advantages of the use of the canal which will shorten the time goods are in transit and eliminate the losses due to damage resulting from the double handling of goods in tropical latitudes. The fact need hardly be noted that the effect of the Panama Canal is not adequately measured by the reduction in the cost of transportation. Such a waterway makes possible the shipment of much heavy tonnage, such as lumber, ore, coal and similar freight that could not be shipped at all between the two seaboards of North America via the routes available before the opening of the canal. The canal will bring into the channels of commerce basic materials produced in large quantities by the extractive industries in the southern and western sections of the United States. The expenses of trade will be reduced and its volume expanded.

The question which most interests shippers and consumers is whether the reduction in the cost of transportation will be accompanied by an equal decrease in the rates charged by carriers. If competition is actively maintained among the coastwise steamship lines and between the carriers by water and the railroads, the charges will approximate the cost of the service, plus a reasonable profit. Shippers and consumers will secure in reduced rates the benefits resulting from reduced cost of transportation. On the other hand, if the coastwise

carriers, by means of associations or conferences, agree with each other to charge the same rates and to maintain rates at such a level as seems to be wise, and if the railroads decide not to reduce their charges generally upon such traffic as can be shipped either by rail or by water, the charges exacted by coastwise carriers will not be determined primarily with reference to the cost of the service but more in accordance with what the shipper is willing to pay. In other words, the service will be based more upon its value to the shipper than upon its cost to the carrier.

The opening of the canal last August was followed by a period of active competition among the water lines and between the coastwise and rail carriers. Each of the coastwise lines established rates independently of the other lines, and put into effect exceptionally low tariffs of charges in order to induce shippers to patronize the coastwise lines instead of the railroads. The coastwise lines quickly secured a large tonnage of traffic. As an illustration of the character of the traffic secured by the coastwise lines, reference may be made to the commodities carried upon a steamer that sailed from Boston on the 23d of August. This vessel had in its cargo 100 carloads of nails from Worcester, Mass.; 140 carloads of structural iron from Pennsylvania; 50 carloads of wire fencing from Pennsylvania; automobile tires and printers' ink from Massachusetts; paper from Maine, electrical machinery from New York and Massachusetts, and boilers from Massachusetts. Among shipments that have been made via the canal have been 1,200 tons of rails from Lorain, Ohio; 15,000 tons of wrought iron from Youngstown, Ohio, and large quantities of wrought iron pipe from Wheeling, W. Va. The canal is drawing its traffic not only from the Atlantic seaboard, but to an appreciable extent from points west of the Alleghany Mountains.

This patronage of the canal route by shippers gave the transcontinental railroad lines connecting the Middle West with the Pacific seaboard much concern as to their future business. The Interstate Commerce Commission was petitioned by the

Pacific railways for permission to reduce the rates between the Middle West and the Pacific seaboard on 107 different commodities, and also upon some classified freight, without being required by the Interstate Commerce Commission to reduce the rates to and from the intermediate intermountain points. On the 29th of January, 1915, the railways connecting the Middle West with the Pacific seaboard were given authority by the Interstate Commerce Commission to reduce the rates between the Middle West and the Pacific coast upon a relatively long list of commodities, without, at the same time, lowering the tariffs to and from intermediate intermountain points.

Whether the Pacific railroads needed to have been so eager to secure permission to reduce rates to and from the Pacific coast is questionable. Before the end of 1914, the coastwise steamship lines, having found by experiment that they could secure all the traffic needed to fill the vessels employed in the intercoastal service, began to raise their rates to a more profitable basis. As was stated by the president of the largest intercoastal steamship line in an interview published December 31, 1914: "Our original rates were experimental and placed on a low scale. We could not determine at the start whether they would be sufficiently remunerative to pay for the cost of operation. This we have found from the experience of five months has been more than we anticipated."

This statement was made in explanation of a very considerable advance in rates made by coastwise carriers toward the end of 1914. The public may expect further advances in coastwise rates as the business by the new route becomes larger and more thoroughly established. These advances in the rates that the coastwise lines have made will probably be followed by increases in the rates of the transcontinental railroad lines to and from the Pacific coast. In other words, the present period of active competition will give way, in time, to a period of well-regulated competition. At present, the several steamship lines are acting independently; in course

of time they will unite in a conference and will make their rates by common action. The rates thus made by the conference of the coastwise steamship lines will probably be adjusted with reference to the rates of the railroad lines, the charges coastwise being made just enough lower than the rail rates to enable the steamship lines to secure the tonnage required to give employment to the vessels in service.

This analysis, if correct, points to the necessity for the government regulation of coastwise carriers. If, as the foregoing reasoning assumes, the relations to each other of carriers by water are the same in principle as the inter-relations of railroad lines, the public interest will require to be applied to carriers by water the principles that have been successfully applied to carriers by rail.

The estimates of the probable tonnage of coastwise traffic using the Panama Canal have been more than realized by the traffic that is actually passing coastwise between the two seaboards of the United States via the new route. On the other hand, the use of the canal by foreign shipping and by vessels engaged in the commerce between European and Pacific countries has, on account of the European war, been very much less than was predicted. Nevertheless, in spite of the effects of the war, the traffic of the Panama Canal is rapidly increasing. During the first six months—that is, up to the middle of February, 1915—about 2,500,000 tons of cargo passed through the canal. The net tonnage of the vessels used in transporting this cargo amounted to 1,750,000, upon which tolls amounting to about $2,140,000 were paid. While it was expected that the American coastwise shipping would comprise about ten per cent of the shipping using the canal, the coastwise traffic has, on account of the European war, been larger than was expected and has been about forty-one per cent of the total canal tonnage. At the present time, about 400,000 tons of cargo are using the Panama Canal each month; that amount will doubtless be much larger before the end of the first year of the canal's operation. If the war in Europe had not occurred

the canal traffic would have been more than double what it is today.

It is evident that the Panama Canal is going to be largely used by the commerce of the United States and of other countries. The canal will undoubtedly be of great assistance to the United States in building up its trade with western South America and with the Orient. The public, however, will do well to bear in mind that the canal will not suddenly revolutionize American trade relations. At the present time the commercial and financial relations of Pacific countries are mainly with Europe and not with the United States. It has been only a few years since American capital began to be invested in foreign countries. The industries of western South America, of Australia and the Orient have been developed mainly by European capital. Under these conditions, European manufacturers have a distinct advantage over American producers in competing for the trade of most Pacific countries.

Similarly, the merchants of Great Britain, Germany and other European countries have long-established trade relations with the Pacific. Their mercantile houses have outposts in South America, Australia and the Orient. It will not be easy quickly to shift the merchandising business from European to American houses. The transfer of trade from Great Britain, Germany and other European countries to the United States will also be hampered by the fact that the banking connections of countries on both sides of the Pacific are mainly with Europe.

The Panama Canal will assist in transferring an increasing share of the trade of western South America and of trans-Pacific countries from Europe to the United States; but the shifting of commercial connections will be gradual. There will be no sudden revolution in the trade relations of Pacific countries. In estimating the influence of the Panama Canal upon the development of the trans-Pacific trade of the United States the fact must not be ignored that the traders of Europe, who have long used the Suez Canal, will have the advantage of a prior occupation of the field. Europe's hold upon the

trade of the Far East is so firm that the United States cannot hope suddenly to wrest the rich prize from the merchants and manufacturers of Europe.

The government of the United States has successfully carried through the difficult task of constructing the Panama Canal, and the great waterway has been opened to the use of the commerce of all nations under terms of equality. What should be the policy of the United States in the management of the canal? In the long run, the management of the canal will probably test the ability of our Government as fully as did the construction of the waterway. The eyes of the entire world were upon the United States during the period of construction, and the President, having been given by Congress unrestricted power to build the canal, was able to construct the waterway with efficiency and with great credit to our country. Business methods prevailed and succeeded. In the management of the canal there should be the same strict adherence to business principles.

Tolls have been fixed to be paid by all vessels using the Panama Canal. The tonnage of the waterway will, it is believed, within ten years, be sufficient to enable the Government to make the canal commercially self-supporting, providing the present rate of tolls is maintained and is exacted of all vessels, American as well as foreign. Doubtless, pressure will be brought from time to time upon Congress and the President to lower the rate of tolls. The Government should resist this pressure until the revenues derived from the canal cover the annual operation and maintenance expenses and the interest on what it cost to build the waterway.

The schedule of tolls fixed by proclamation of the President, issued November 14, 1912, makes the charge for the use of the canal $1.20 per net vessel ton, there being a forty per cent reduction from the charges in the case of vessels passing through the canal without passengers or cargo. The tolls upon warships were placed at fifty cents per ton of weight or displacement. The tolls upon merchant ships were placed

upon the net tonnage of the vessels, because it was deemed wise to base the charge upon the earning capacity of vessels. The ton as applied to the vessel does not mean weight, but 100 cubic feet of space. The space or tonnage upon which tolls are paid includes that part of the vessel that is available for the stowage of freight or for the accommodation of passengers. The rate of $1.20 per vessel ton was adopted because it was found after investigation that a charge of that amount would not prevent the use of the canal by any considerable volume of traffic. This rate is also practically the same as that charged by the Suez Canal Company for the use of its waterway.

The revenues derived from the canal depend upon the rate of tolls and upon the rules applied in the measurement of vessels to determine the number of tons upon which the tolls shall be paid.

The revenues needed to make the canal commercially self-supporting will amount to about $20,250,000 per annum. This large total is made up of the following items:

For operation, maintenance, zone sanitation and government..	$5,000,000
For annuity payable to the republic of Panama.....	250,000
For interest at 3 per cent upon the cost of the canal.....	12,000,000
For ¾ of 1 per cent per annum for amortization of the investment.....	3,000,000
Total.....	$20,250,000

The studies that have been made of the traffic that will be served by the canal indicate that by the end of the first decade of the canal's operation, *i. e.*, by 1925, the tonnage of vessels using the waterway will amount to 17,000,000 net tons per annum. At the present rate of tolls a tonnage of that volume would yield revenues covering all operating and capital expenses. If the rate of tolls that have been established is maintained for ten years and if subsequent reductions in the rate of tolls are conservatively made, it will be possible for the American people to secure from the Panama Canal revenues that will cover out-of-pocket expenses and return to the United States treasury

the sum that has been invested in the waterway. This can be done without restricting the usefulness of the canal, and if this policy is followed out it will be possible for the United States, with less burden to the taxpayers of the country, to construct other needed public works.

A scientific code of tonnage rules has been formulated and put into force for the measurement of all vessels using the Panama Canal. The experience of the Suez Canal Company shows that those who have to pay tolls are constantly endeavoring to have the tonnage rules so changed as to lessen the amount paid by vessel owners. It is to be hoped that the President and the Secretary of War, who are in charge of the administration of the canal, will resolutely maintain the tonnage rules as they now stand, or will make only such modifications in the rules as may be required to give them greater definiteness.

For the present, at least, the Government is definitely committed to the policy of treating the vessels of all flags with entire equality as regards tolls and other conditions affecting the use of the canal. Regardless of our obligations under the Hay-Pauncefote treaty, it would have been a serious mistake for the United States after having constructed the Panama Canal as the trustee of the nations of the world, to have adopted a policy of discriminating in favor of the vessels belonging to its own citizens. For more than a half century before the Panama Canal was opened, the United States was committed to the policy of a canal across the American isthmus under terms of entire equality to the shipping of all nations. It is to be hoped that the canal will remain neutralized in the fullest sense for all time. If we adhere to this policy, we will have followed sound business principles, and we will have kept the promise we made in the Hay-Pauncefote Treaty.

FACT AND ILLUSION

By Edwin B. Twitmyer

Professor of Psychology and Assistant Director of the Psychological Laboratory, University of Pennsylvania

In the introduction to one of his lectures, Professor Clifford alludes to an old-time catechism to which youths were regularly subjected by parents who were solicitous for the intellectual development of their offspring. The son, being properly adjusted on his father's knee, was drilled in the following dialogue:

Father: "My son, what do you see with?"

Son: "Father, I see with my eye," at the same time pointing with the index finger to the eye. The dialogue continued in this fashion until the five avenues of sense experience were named. The five-fold classification of the special sense mechanisms is still current today in most of our school text-books in physiology. It is a mystery that the mere naming of these five senses should seem to stand as a satisfactory statement of the way in which we gain our knowledge of the external world.

It is my purpose this afternoon to attempt an analysis, for the purpose of suggesting to you first, that the process of perception through any sense avenue is not a simple matter but extremely complex, and secondly, that by virtue of this complexity, many of the factors in the process varying independently, we are subject to the phenomena of sense illusion. I wish to illustrate these points in a concrete way and will, therefore, confine my remarks to visual perception and visual illusion because of the facility with which they may be demonstrated. I do not wish, however, to convey the idea that the analysis pertains exclusively to vision.

Look at the diagram on the screen. At once you will have aroused in your minds a mental content the character of which

may be readily indicated by the term *staircase*. In passing I wish you to note that the diagram, which we call the stimulus, is simply an arrangement of black lines on a white surface. The drawing is purposely quite lacking in perspective. I wish you further to note that your mental reaction, the perception of a staircase, is immediate—in the same sense that your perception of heat is immediate when your hand comes in contact

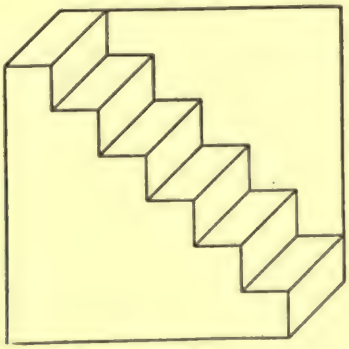

FIG. 1.

with a hot object. It is not necessary to call up a series of associated ideas or memories to insure recognition, as one might be compelled to do in order to identify some little known object or person.

[Slide was shown using same arrangement of lines as Fig. 1, but with shading added to suggest perspective.]

The diagram now on the screen is the same arrangement of lines. Shading is added to suggest a definite perspective. I use this illustration so that I may be sure every one in the audience really has experienced the perception of a staircase.

[Slide was shown using same arrangement of lines as Fig. 1. The shading of the figure produced a reversed perspective of Slide 2.]

The next diagram again makes use of the same arrangement of lines. This time, however, the shading used suggests a totally different perspective. The staircase content I expect

to be displaced by a new one, namely, that of a staircase as though seen from below; or perhaps we might better describe it by calling it an overhanging cornice. When you succeed in getting this new perception there will be no doubt in your minds as to the change. A staircase seen from above is a totally different perception than a staircase seen from below. Now if we return to our original arrangement of lines in which little or no perspective is suggested, I think you will be able to see at will the figure as a staircase from above or a staircase from below. You may even go still further with this arrangement of lines and see it as a piece of paper folded in an accordeon plait and held at right angles to the plane of the background; or some may be able to see the figure as a simple arrangement of lines on a blank surface, a perception wholly lacking in third dimension.

If you have followed this simple experiment you are now ready to realize that from a single external object, *e. g.*, the figure on the screen, it is possible to experience two, three, four, perhaps even more, totally different perceptions. Seeing is not necessarily believing. We may properly raise the question, what, after all, is the truth in this situation? Is it really the representation of a staircase, or the representation of a staircase seen from underneath, or an accordeon plait? Can it be all three of these at one time? What confidence can I place in my sense experience?

We must believe that the sense process involved in each case is approximately the same. The physical stimulus does not change. We have no reason to believe that our eyes undergo any great change from moment to moment. We are therefore justified in the statement that the purely sense process remains fairly constant. If we can, from a constant sense reaction, experience these widely different perceptions, some processes in addition to the sense process must be contributing to the outcome. We are not, strictly speaking, seeing with our eyes.

Let me assume that every one of you up to the present moment had lived in a place we may call "Flatland," a place where you

never had occasion to change your altitude either by stepping up or stepping down; that your education had never included notions of going up and going down. Do you believe that, confronted with this stimulus, you could possibly respond to it with the staircase content? Clearly, the very fact that you have had many and varied experiences with change in elevation is somehow related to this present perceptual process. You see a staircase with your eyes only in part. You see a staircase with your "mind's eye." You see a staircase by virtue of your previous experiences. If I could, by any means, bring about a state in which your past experiences would fail to associate immediately with the present sense stimulus, then clearly it would be impossible for you to see a staircase from above. If I could further produce a condition in which none of your past

FIG. 2.

experience of projected cornices, or folded papers, or plane surfaces or black lines, etc., would immediately associate with the present sense stimulation, then the outcome in perception of necessity would be of the most simple character, vague, ill-defined, having little, if any, meaning.

Perhaps I may tarry to consider briefly the various phases of simple sense reaction. When rays of light are reflected from an object, all of the rays which happen to enter the eye are focused point for point upon the retina producing an actual image.

This image is inverted and in many other respects is similar to the image on the ground glass plate of the camera. The existence of this image of course leads to the question, why do we see things right side up? This question is at once answered when we consider further the physiological processes taking

place in the visual act. The image does not go beyond the retina. The existence of the image has no significance beyond the fact that a mass of pigment cells, corresponding in their location and distribution to the boundaries of the image, undergo a photo-chemical process as a result of the action of light falling upon them. The situation is analogous to the change produced upon a sensitive plate by the action of light. [Slide was shown showing the microscopic elements of the retina, particularly the anatomical relation of the layer of pigment granules to the rods and cones.] This photo-chemical process immediately causes the arousal of a nervous excitation quite different in character from the chemical changes in the pigment cells. By means of innumerable nerve fibers connecting the retina with the cortex the excitation finally reaches the brain in the occipital region, and there brings about a physiological reaction of the constituent cortical cells. [Slide shown representing the posterior region of the mesial surface of the human brain.] This brain region may as appropriately be called the organ of vision as the eye itself. The destruction or removal of the former results as inevitably in blindness as the loss of the latter. But in no sense has an image been carried from the retina to the brain. It is at once apparent that the terms *erect* and *inverted* have no significance whatever when applied to the cortical reaction. In some mysterious manner the functioning of this restricted cortical area gives rise to simple color sensations in consciousness. If we wish to speak within the limits of accuracy, then we can say that the simple retinal process yields no more to the mind than the mere patches of color, in our experiment white and black. The sense impression of itself fails entirely to give an accurate image of an invariable fact. The mind's reaction is needed to complete the process. The series of impressions constantly aroused by the stimuli of the external world may be viewed as mere hints or symbols which we must learn to interpret as we learn to interpret the characters of a written language. These sensory hints, according to Berkeley, become so "closely twisted, blended, and

incorporated together, and the prejudice is so confirmed and riveted in our thoughts by a long tract of time, by the use of language, and want of reflection" that the object of the universe seems to be completely perceived.

My experiment is successful because in common we have had many and varied experiences with stairs; our minds have been so modified and determined by these experiences that the contribution to the perceptual process is forthcoming immediately upon the presentation of the stimulus. Whenever a stimulus evokes a universal experience, perceptions resulting from a given stimulus are in agreement. You and I see the same object; this is usual even though the stimulus itself is fairly indefinite. May I demonstrate in this way?

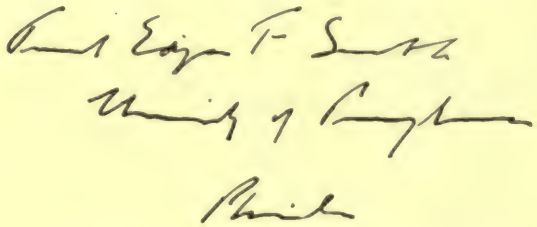

FIG. 3.

I have no doubt at all that every person in the audience is reading without hesitation from the screen as follows:

"Provost Edgar F. Smith, University of Pennsylvania, Philadelphia." I wish to state that this is not a reproduction of the Provost's handwriting.

A second glance will reveal the fact that the writing is very imperfect, and that one can scarcely say that a single word is properly represented. Because you have accumulated many experiences with many kinds of handwriting, and because the ideas suggested by these symbols are so well known to you, you experience no hesitation in your reaction. I am sure that from most of you I would receive exactly the same result

should I further mutilate or distort the words. With only two or three suggestions as, for example, rather perfectly formed initial and final letters of well-known words such as these, the other letters replaced by approximately straight marks, the stimulus would in most cases be sufficient to arouse a definite perception. M. Lazarus relates the following:

"Of two friends of mine, one knew much Hebrew, the other little; the latter, however, gave instruction in Hebrew in a gymnasium; and when he called the other to help correct his pupils' exercises, it turned out that he could find out all sorts of little errors better than his friend, because the latter's perception of the words as totals was too swift."

Carrying the experiment a step further, I have no doubt

FIG. 4.

many of you will interpret the ink blots now on the screen as representing some real objects. They will perhaps be seen as faces, as animals, as various kinds of vegetables, etc. If definite ideas of this kind are aroused by these indefinite stimuli, then it is because a very large contribution is being made from the mental experience of the percipient. Plato speaks of an image going from an outer object toward the eye and sight flowing out from the eye to meet the object.

Keeping in mind what I have said thus far, let us assume that under a given stimulation the wrong group of experiences becomes associated with a present sense reaction. This might be the case if, perchance, a truant newspaper caught on a hedge, and moved back and forth slowly by the breeze, should act upon

the retina of an individual whose mind had been crowded with ideas of ghosts. These ideas may have had their origin in the early childhood of the individual when ghost stories were related to him for purposes of repressing his buoyant spirits. Here we have a typical illusion. The fluttering paper becomes a ghost, because the sense process itself is so small a part of the total mental reaction and the elaboration or interpretation is so large a part of it. Professor James tells of his own experience, "I was lying in my berth in a steamer listening to the sailors holystone the deck outside; when on turning my eyes to the window, I perceived with perfect distinctness that the chief engineer of the vessel had entered my stateroom, and was standing looking through the window at the men at work upon the guards. Surprised at his intrusion and also at his intentness and immobility, I remained watching him and wondering how long he would stand thus. At last I spoke; but getting no reply, sat up in my berth, and then saw that what I had taken for the engineer was my own cap and coat hanging on a peg outside the window. The illusion was complete; the engineer was a peculiar looking man; and I saw him unmistakably."

At this point one might very properly raise the question, how may I ever come to know that a given sense impression is being rightly interpreted? What measurements can I apply, or by what means shall I verify my experience? This question might involve considerable discussion. This afternoon I pass by rapidly with the statement that our experiences maintain in a way a general average. This then becomes the chief criterion. If the experience comes within the accustomed range of experiences, we believe the interpretation has been correct. If the perception, however, is clearly outside the range of average experience we do not accept it immediately, but subject it to further questioning. Such questioning usually is accomplished by an appeal to the other sense realms. If I wish to test out a ghost experience, for example, the best way is boldly to proceed with firm step and seize the ghost with violent hands.

Going beyond the analysis offered thus far, I wish to speak in

some detail of certain other factors involved in visual perception, which, no doubt, play an important rôle in many optical illusions. It is to be remembered that the only mental counterparts of retinal stimulation are color patches. The complete process of vision, however, involves rapid excursions of the eyes over the constituent parts of the object. These movements are accomplished by the contraction of twelve eye muscles [slide showing the anatomy of the muscles of convergence of the human eye], six for each eye, wonderfully adjusted and co-ordinated in their action. Whenever a muscle in any part of the body contracts, a stream of excitations passes to the brain because a large number of sensory nerves have been stimulated mechanically by the rearrangement of the constituent cells of the muscles, the articulation of the joints, etc. The cortical reaction excited by these stimulations arouses *kinæsthetic* sensations. If you will extend your arm, and then bend it, paying some attention to the feel of the arm, you will experience very definitely a group of these kinæsthetic sensations. In precisely the same way, though not of course to the same degree, the movements of the eyes, brought about through the contraction of these twelve muscles, arouses a group of kinæsthetic sensations. These may pass unnoticed for a long time, only becoming prominent in consciousness when the point of fatigue is reached. I want to demonstrate this fact if I can.

The bit of sculpture on the screen, at the distance most of you are sitting from the screen, is too large to fall within the field of distinct vision. The fact that you see the object as a whole proves that your eyes move about. I believe the motif for movement is so well suggested in this diagram that you will perceive at once, at least when I suggest it, that your eyes begin at the upper outside border of the figure and move in a sweep from the left toward the right and in toward the center. Then a second eye movement of a similar sort ensues, the eye having rapidly jumped from the center back to the upper outside border. These movements, of course, take place very rapidly, and there are many, if untrained in introspection;

who will fail to notice these movements and the sensations resulting from them. It is, however, possible in the laboratory to take a moving picture of the eye while viewing such an object, and by subsequent study of the successive photographs deter-

FIG. 5.

mine with considerable exactness the character and direction of the eye movement. [Fig. 5 reversed was then shown.]

If we reverse the slide on the screen, most of you will find that your eyes begin at approximately the same point, but now move from the right toward the left over the constituent elements of the figure, arriving at the center. The figure in the first position is usually more pleasing. Precisely the same retinal elements associated with eye movements toward the right gives a more pleasing outcome than when associated with eye movements toward the left. I am convinced that for most people there is a definite habit of eye movement. This habit is preferably from the left toward the right. The figure in its first position is more pleasing because the elements of the figure are so disposed as to fit in with the habitual eye movements, whereas in the second position the elements in the figure determine movements counter to the eye habit of most people. I use this demonstration principally to emphasize the fact that visual perception involves not only the simple retinal or color elements, but that these retinal elements are always associated with

kinæsthetic elements which may vary in intensity, in quality, and in relative agreeableness or disagreeableness.

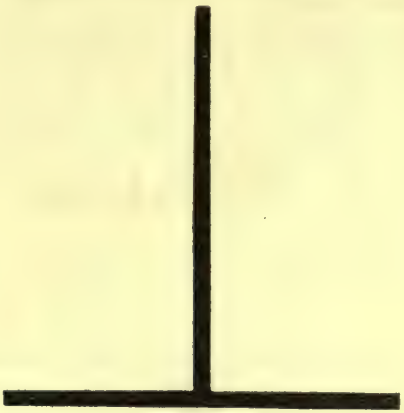

FIG. 6.

[The slide used enabled the lantern operator first to throw upon the screen the horizontal line, and then gradually to increase the length of the vertical line until it just equaled the horizontal line.]

The experiment just performed shows clearly how associated kinæsthetic elements may produce an illusion. To considerable extent, the length of a line is judged on the data obtained from eye movement, but two lines of equal length may elicit eye movements requiring different periods of time and giving rise to different kinæsthetic sensations. This is the situation in our experiment. The eyes exploit the horizontal line from left to right and then back again, or from the center to one end and then to the other. These excursions are accomplished easily and rapidly because they conform to fixed habits of movement. The vertical line is viewed with a sweep of the eyes upward, beginning at the middle point of the horizontal line. The movement is not an habitual one. It is relatively more difficult to accomplish and requires more time. This increase in time

and effort is equivalent in consciousness to a greater distance, hence the vertical line, as compared with the horizontal line, is very much overestimated.

In the more complicated optical illusions we have many factors to deal with, and necessarily the analysis becomes correspondingly difficult. Even with the help of laboratory equipment and method, few optical illusions have been completely accounted for. I shall, therefore, give you a few illustrations without attempting further explanation.

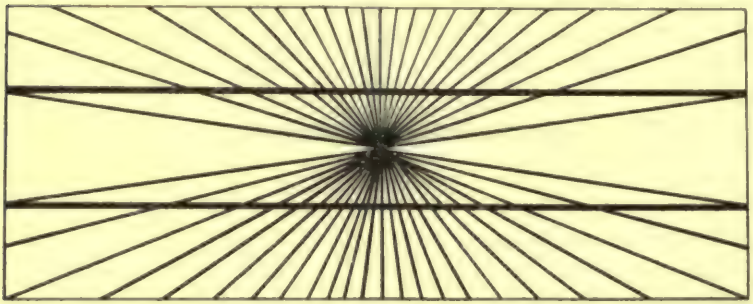

FIG. 7.

In the figure, known as Hering's illusion, the parallel horizontal lines seem to converge at the right and left extremities and bow out about the middle. There is also a constant illusion in perspective, the point from which the lines radiate being seen as the most remote from the eye.

The next is Zöllner's figure. The long oblique lines are really parallel. The illusion, however, is so striking that a demonstration would inspire more confidence than my mere statement. Try a further experiment with the figure. Think of the third long line, counting from the top of the drawing, as a railroad with a single rail. The short horizontal lines then represent the ties supporting the rail. Now think of the oblique line just above or the one just below as a fence with a single rail

supporting the pickets, represented by the short vertical lines. The two oblique lines, with these mental anticipations, will seem perfectly parallel.

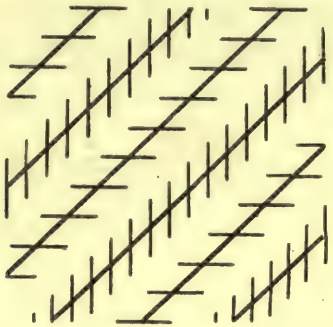

FIG. 8.

[Eight different illusions were then demonstrated.]

The first exercise in analysis reveals the fact that the process by means of which we gain our knowledge of the external world is not so simple as suggested by the nursery catechism. Perception must rather be viewed as a mental achievement. It is a synthesis resulting from the fusion of a number of sense data with the mental accumulations of a lifetime. When the perceptions aroused through one sense organ, for example the eye, are in agreement with the testimony of another sense realm, such as touch through, which we may gain perceptions of the same external object, the presentation in consciousness seems to be verified and is accorded at once a large degree of confidence. In as much as all normal human beings are equipped with practically the same sense organs and, within large communities at least, have had approximately the same range of experiences, our perceptions seem in practical agreement. Such perceptions then, with no contradictions among the data from the different sense organs and in practical agreement with the results of other observers, are accepted as *facts*. We sit down on chairs and dodge motors because our perceptions of these objects are for

us *facts*. To establish *facts* in this sense is the task of courts of law; observing, recording, and classifying them constitutes the domain of science.

When the data from the different sense realms, however, are not in agreement, or the sense elements somehow become associated with an inappropriate experience group, we have the basis for an *illusion*.

THE SEARCH FOR PHYSICAL PERFECTION

By R. Tait McKenzie

Professor of Physical Education and Director of the Department of Physical Education, University of Pennsylvania

Physical perfection is almost as hard to define as truth, but if one were driven to a definite statement one might say that the perfect man or woman is the one best adapted to his surroundings and occupation.

This could even be extended throughout the whole realm of animal life. Among dogs the spaniel, the greyhound, the bull terrior or the mastiff all have their conventions of perfection which vary widely, and yet all of them are dogs. The long neck and ungainly legs and padded feet of the camel make him an ideal or perfect carrier in the desert, although his lines suggest anything but perfection to the lover of good horse flesh.

In the history of mankind we find the ideals of perfection follow a definite course, and among the early Egyptians, as among the early Greeks, the adoration of physical strength and force is always uppermost in their minds, for it takes a high state of civilization and the practice of the arts of peace to replace the worship of brute force by grace, mere strength by refinement. It is perhaps natural that primitive peoples should look to strength rather than grace, because the cave man and his successors needed a heavy hand against the forces of nature and against his neighbors, and his stone axe and bronze spear were useless except when backed by a strong arm.

Samson was the symbol of the hero who could deliver the Jews out of the hands of the Philistines by his strength. Saul stood a head above all the rest of the people. Hercules was godlike in his overwhelming physical power. No one but himself could wield the great sword of Sir William Wallace.

The Egyptians seem to have passed through several periods

in the history of their art, the first being the worship of that type which might be spoken of as the Herculean type—the powerful, broad-shouldered and heavy-set figure of the man capable of fighting and resisting fatigue and hardship; but as life became easier and their culture increased, they slowly changed to the lighter and more graceful forms.

The Greeks recorded in their sculpture the battles of the Amazons, those superwomen who fought on equal physical terms with their men antagonists, powerful, deep-chested women, broad hipped, with a strong and well-muscled frame, and the degeneracy of the empire was reflected by a certain softness of form in the sculpture of the followers of Praxiteles and the effeminacy of the period expressed in the Apollos and Fauns, almost woman-like in the suavity of their lines.

Where man is brought into direct conflict with the laws of nature, where he is struggling for his very existence against rivals, where war is uppermost either against nature or other people, the Hercules or the Samson must necessarily be the national hero and the type toward which they look. As the necessity for the actual struggle becomes more and more remote, when the preparation for warfare becomes indirect and the exercises of the field and gymnasium take the place of the more purely military evolutions, a change comes over the national ideas and is reflected in their sculpture and painting. In Crete, an isolated and highly civilized country, even their earliest paintings show the slender and delicate type of figure that is prized by a refined and highly civilized race, while all around them, both before and after, the cult of force held sway.

In order to find perfection it is, of course, necessary to have a standard by which to compare parts with one another, and this quest for some rule or canon of proportion has fascinated artists throughout all time. Different segments of the body have naturally been taken because they are easily applied and readily understood, and the most available of all, the forearm and hand, or the cubit, has been used continually as a convenient unit of measurement. A two-cubit rule was found in the temple at

Karnak, and the temple at Jerusalem was measured according to the "cubit of a man." The word "ell" comes from the Latin *ulna*, the bone of the forearm. The span of the arms extended is responsible for the "fathom." The hand is still used, standardized at four inches, in measuring horses, while the French word for inch is "pouce," or thumb breadth, the digit is a finger-breadth, and the middle finger, or finger of Saturn, is undoubtedly a unit employed by the Egyptians in the canon of Lepsius. The girdle or girth of the waist is responsible for our word "yard," the "pace" is still used, while the word "mile" comes from the Latin, meaning a thousand paces. It is said that Hercules laid out the stadium at Olympia by pacing off six hundred of his own foot-lengths. Other stadia in Greece measured in the same way appeared shorter, and from this data Pythagorus is said to have calculated the height of the hero, and to have given use to the expression "Ex pede Herculem."

The earliest clear case of a search for some rule for the measurement of the body occurs in the wall paintings of Egypt Lepsius describes three canons of proportion as having prevailed in Egypt. The first, which was short and heavy; the second, taller and less robust; and the third, which is illustrated in a drawing discovered by him of a high priest holding in his right hand the temple key while his left is extended at the side. Cross lines divide the body into nineteen equal parts, and the middle finger lying between two of them is thus contained nineteen times in the entire height.

In his work on Egyptian architecture Henzlman also selected the middle finger as his unit of measurement in determining the scale of human proportion as related to architecture. There seems little doubt that this is the Egyptians' canon or rule of measurement. There also seems little doubt that the influence of Egypt in the early Greek art was predominant and that the canon of the Egyptians was for a while accepted and applied until we come to the best age of Greek sculpture, 450 B. C. In that great group, Phidias, Myron and Polycleitus, the last named established his school in Argos, where among his many

triumphs he produced the "Doryphoros," or the spear bearer, commonly called the canon. This statue we know unfortunately only from the words of classical writers and more or less inaccurate copies in marble. Neither the original nor any copy in bronze has survived, nor have we the book written in exposition of it by the artist, but allusions to it are many in the works of Plato, Lucian, Pliny and Vetruvius, and in the library of the University of Venice was found a manuscript of Leonardo in which is written in Greek characters the canon of Polycleitus, from what source derived we know not. This is so interesting historically that I will quote the paragraphs in which it is described:

"The standards according to which all admeasurements are wont to be made are likewise deduced from the members of the body, such as the digit, the palm, the foot, and the cubit, all of which are subdivided by the perfect number which the Greeks call Teleios.

"Nature in the composition of the human frame has ordained that the face from the chin to the highest point of the forehead where the hair begins is a tenth part of the whole stature. The same proportion obtains in the hand measured from the wrist to the extremity of the middle finger. The head from the chin to the top of the scalp is an eighth. From the top of the chest to the highest point of the forehead is a seventh. From the nipples to the top of the scalp is a fourth of the whole stature. If the length of the face from the chin to the roots of the hair be divided into three equal parts, the first division determines the place of the nostrils, the second the point where the eyebrows meet. (The ear likewise is a third of the length of the face.) The foot is a seventh part of the height of the entire frame. The cubit and the chest (the width across the shoulders) are each a fourth.

"If a man should lie on his back with his arms and legs extended, the circumference of the circle which may be described about him with the umbilicus for a center would touch the extremities of his hands and feet.

"The same obtains if we apply a square to the human figure, for like the contiguous sides, the height from the feet to the top of the head is found to be the same as the distance from the extremity of one hand to the other when the arms are extended."

Leonardo piously adds as a foot-note to this, "I will praise thee, for I am fearfully and wonderfully made."

So great was the authority of this figure of Polycleitus that for almost a hundred years it remained unchanged and it was not until under very different conditions that the school of Lysippus succeeded in impressing upon the artistic world the taller and more graceful figure known as the "Apoxyomenos," an athlete scraping himself with a strigil.

In comparing these two youths, one is struck by the fact that the later work shows a much smaller head, a shorter body, a more slender and graceful figure, as would be expected in the models from which he worked—the young men of the palestra and the gymnasium rather than the more sturdy warriors of the earlier day. These two extremes may be said to represent the Greek contribution to the study of proportion.

Leonardo da Vinci, that versatile genius, made many elaborate drawings to determine proportions of the body. His figure in the square is well known, although taken from the canon already referred to. He also made many drawings of the face showing the relations of part to part, and it was his intention not only to write a book on proportion, but also one on anatomy, for which he prepared himself by actual dissection.

It is also well known that Michael Angelo was interested in proportion, as his sketches and drawings still show, but, although no one had a more profound knowledge of it, no one took greater liberties with the body's proportions when he wanted to vary them for any special purpose. He reduced the size of the head beyond the limits of nature in order to get the impression of height and majesty in his "Moses" or to get lightness and gracefulness in his "Madonna," while the half-grown figure of "David" is emphasized by the large hands, feet and head.

Many other artists have contributed to the study. One of

the most interesting is Albert Durer, whose treatise in four books was published in 1528. A remarkable analysis of proportion it is, showing ideal measurements for the short, the tall, the fat and the thin, the scale going all the way from six heads in height up to twelve. As a mathematical research it is wonderful, but it has only a remote connection with what one finds actually in life.

In more recent times a number of men have attempted to get some mathematical figure by which the proportions of all parts of the body could be deduced if one were given a single unit, and the diagrams of Hay, Gibson and William Story are most interesting in their attempt to accomplish this. Carus, of Dresden, taking the length of the spine as a unit, divided it into three hand lengths and projected a figure from which both the male and female could be deduced by adding breadth to the shoulders for the male and narrowing the shoulders and broadening the hips for the female.

Scientists also have tried by the compilation of measurements to discover the best type to suit the conditions of modern life, and the figure of "The Typical American Student" both male and female, compiled by Dr. Dudley A. Sargent of Harvard from thousands of measurements, has put in concrete form this fact if not this ideal.

The average measurements of all students, good and poor, will produce a mean or average series of proportions, and a figure constructed to follow these measurements must represent more or less closely the actual facts if not the ideal proportions for survival under our conditions of civilization.

The American youth does not show up so badly, coming as he does in his proportions between the two extremes of the Greeks; but the college girl, modeled from the measurements taken during the last thirty years, shows a rather flat-chested and poorly developed young woman. The female figure differs from the male by having more sloping shoulders, which give the appearance of a longer neck, a much smaller chest and waist and a pelvis which is lower and straighter than the pelvis

of the male. This projects the heads of the thigh bones outward, giving a long, sweeping line from the lower ribs to some distance below the head of the thigh bone, thus giving the appearance of a longer waist. The bones are smaller and the muscular attachments not so well marked.

For this reason women are not so well adapted to running, leaping and to such gymnastic feats as require the support of the body weight by the arms, and wherever you find a successful performer on the horizontal bar, parallel bar or flying rings among women, you are sure to find her approach the masculine type. The Amazons competed on even terms with their enemy, but tradition says that they had to cut off their left breast because it interfered with the full drawing of the bow.

If we compare the typical student of our women's colleges with the deep-chested vital type that has come to us through the royal succession of Venuses like the "Venus de Milo," we are apt to become pessimistic over the future of the race. The flatness of the chest and smallness of the hips spring to the eye. If we compare her with the generous impersonation of maidenhood that we have from the chisel of Victor Rousseau, the Belgian sculptor, we cannot but see how she suffers in those proportions which have so much to do with a powerful vitality and with the survival of the race. Possibly this may be some explanation for the fact that the native American race depends for its continuance so largely on immigration. It may be argued that this is not the ideal, that it is merely the typical. That is true, but it is the type that has survived in greatest numbers our present manner of life. If we are to improve the type we must necessarily better the physical conditions under which we live and move, by a return to more natural methods of life and more use of the playground and summer camp.

Shifting fashion has a more potent influence on our ideas of perfection even than the conclusions of our artists and scientists, and it is fortunate that they change so often. The "debutante slouch" may undo the teaching of years in as many months. Ladies are never quite sure a year ahead what the fashionable

figure will be. Some years hips are to be encouraged and displayed and the next year they must be suppressed. Shoulders may or may not be in vogue, and the present tendency seems to be away from those proportions so much admired by the aristocracy of Africa.

Speke, the African traveler, in visiting an African king at Shendi, observed the wife seated at the king's side was so fat she was unable to rise. She was surrounded by milk pots, and pointing with pride to his consort, the king said to him, "This is the product of these pots." His daughter, a girl of sixteen, was serving an apprenticeship under the watchful eye of her father, who kept her constantly at work on the milk by the rod he held in his hand, that she in turn might uphold the family dignity and fill her mother's chair. Thus we see that even in Africa the trials and disadvantages of fashionable life are not entirely to be escaped. Whether or not it was this influence that determined the fashionable figure in Egypt we do not know, but we do know that the Queen of Meroe as represented in the wall paintings was distinctly of this steatopygous type. But not only by overfeeding or by the decoration of the skin has fashion endeavored to improve the imperfect work of nature. It is not so many years since the requirements of fashion demanded the constriction of the waist to such a point that the liver was almost cut in two, the breathing power reduced and the health of the thin-waisted devotee of fashion seriously impaired.

It is a pathetic thing to see the extent to which fashion can drive a people in the production of deformity. The flat-head Indians compressed the forehead of their infants until the skull went up to a point at the back like a gabled roof. The Chinese with their foot bandages produced the golden lilies at the expense of twisting and distorting the foot beyond recognition.

The increased activity to which women have been allowed has done much to do away with fads ruinous to health and well being, and to this more than to any other one cause can be laid the great improvement in the construction of the modern corset,

which applies its compression over the hips where it can do no harm, and allows of the freest movement in the waist and chest.

The place of sport and exercise in changing the development of the body has been greatly misunderstood. It is a common belief that football develops large and burly men, that swimming develops fat men and that running makes men's legs long, that jumping develops human kangaroos. This is, after all, putting the cart before the horse. A man will select naturally such events as will enable him to succeed through the peculiar structure of his individual body. The wrestler with a short neck, powerful shoulders and body, and great muscular strength, has an enormous advantage over a competitor whose long neck lends itself to a good half Nelson. The hurdle runner who must clear the ten yards between the hurdles in three strides, should have a certain height and length of stride if he is to have any chance of success in this particular competition. And so the hammer thrower needs height, and the shot putter has an advantage in being able to place great weight behind the missile. The jumper has also an advantage whose light bones are covered by well-developed and powerful muscles.

As far back as the time of Philostratus this division of men according to their muscular ability was made and in his quaint way he divided them into classes according to the animals they most nearly represented, such as the bear, which would remind one of the wrestler; the lion, which would make us think of football player and boxer; the greyhound, the sprinter; and the stag, the oarsman and perhaps the jumper. In spite of this, however, it is not always easy to choose from the physique alone the type that will succeed in any one form of muscular endeavor. The short legs of a jumper may be more than counterbalanced by a fine power of concentration which sends him over the bar far above his head. William Byrd Page jumped about eight inches above his own height. Sprinters are tall and short, stout and thin, counterbalancing physical defects by unusual intelligence or mental concentration, and it is only where the athlete comes in competition with certain immovable

apparatus or implements that his type must conform to certain requirements. The great athlete, then, is perfect after his kind. Even the sprinter, whose type varies so much, is typically a man of five feet, nine inches, with a square chest, well-muscled shoulders and torso, legs sturdy though not unusually muscular, with rather light bones, and always a fine power of mental concentration and a short latent period.

In our search for perfection we may go for encouragement to the dimensions of a statue that might be called the ideal athletic student. This little figure ("The Ideal College Athlete") was modeled from the average of four hundred measurements of men who had excelled in all forms of sport and who showed by their strength records that they were worthy of a place in the first fifty out of several thousand men examined. By thus choosing men through the record of their strength we were enabled to exclude the variations and imperfections characteristic of certain special forms of exercise, individual peculiarities of build gradually becoming obliterated in the mass of measurements collected. The resultant figure which corresponds in height and girths to the average of these picked men would in life have a height of five feet nine inches, a weight of one hundred and fifty-nine pounds. The girth of his neck, knee and calf is the same, with the upper arm one inch and a half less; the girth of his thigh half an inch less than that of his head. He has a forty-inch chest, with a waist ten inches less, while the length of his foot and the breadth of his waist are practically the same, and his stretch of arms exceeds his height by two inches, thus showing the inaccuracy of the canon of proportion which places these two measurements as the same. The pose chosen represents him as placing in his right hand the spring dynamometer with which he is about to test the strength of his grip. It is merely an excuse for a more artistic arrangement of line than could be got by having him in a more purely conventional standing pose.

If we compare him with the two divergent canons of proportion we find him taller and more slender than that of Poly-

cleitus, and stouter and more heavily built than that of Lysippus. He stands between the two extremes. The tendency of all scientific investigations in which the facts are determined by measurement is disappointing from the spectacular standpoint. We always find that the remarkable development which we associate with certain individuals disappears in the general average, and the strong man of the colleges, instead of being, as one might expect, a Sandow or Hercules, is merely a rather well-set-up young man showing no physical eccentricity. The ideal American girl student has never been put in sculptural form as yet. It would be interesting to see if she too showed an advance on her sister the average, as great as that shown by her ideal athletic brother.

THE HEALTH RELATIONS OF THE HUMAN MOUTH

By Edward C. Kirk

Professor of Dental Pathology and Therapeutics, and Dean of the Evans Dental Institute, University of Pennsylvania

It has been for so long a matter of common knowledge that a sound and regular set of teeth in a healthy mouth contributes in a large degree to the general health of the body by enabling us to efficiently masticate our food, that we have come to value our teeth mainly from the point of view of their usefulness as a masticating machine. It is unquestionably true that any circumstances which bring about loss of the teeth wholly or in part, or which lead to irregularities in their position, will cause serious interference with the function of mastication, and this in turn may lead to digestive disturbances and a long train of disorders which follow in the wake of indigestion.

The teeth of man, as is equally true of all animals, are adapted to the food habit, and as man is omnivorous, his dental mechanism is so constructed that it has the shearing or cutting efficiency necessary to divide into smaller particles the flesh of food animals, constituting an important part of his dietary, and it also has the grinding function necessary for the mastication and pulverizing of vegetable foods, starches and fibers.

In a normally developed and arranged set of teeth, so perfect is the adjustment of the individual teeth in their relationship to each other and to the denture as a whole, that even the loss of a single tooth will disarrange to a noticeable degree the entire mechanism, and reduce its efficiency to an extent that will markedly impair the function of mastication.

The division of food materials into smaller particles by the act of mastication, is the first operation which food must

undergo in that series of operations necessary to its proper preparation for the nourishment of the body and the maintenance of its vital activities. By thorough mastication the food is reduced to small particles so that it may more readily undergo those chemical changes, through the agency of the several digestive juices of the body, by which it is prepared for absorption and assimilation. The initial process of digestion, particularly of starchy food, begins in the mouth.

The saliva which is poured into the mouth cavity in large quantities, particularly when dry or starchy foods are undergoing mastication, contains a ferment substance called ptyalin, which has the property of converting starch into sugar, and it is very important that starchy foods should be thoroughly masticated, not only for the purpose of dividing them into minute particles, but particularly that the salivary ferment may be thoroughly incorporated with the starchy food bolus and convert its insoluble starch into soluble sugar. If this preliminary chemical change is not brought about, the starch is not digestible, and becomes an irritant to the system in various ways instead of a means of nutrition. It is because of this fact that the popular propaganda of Fletcherism is, to that extent, at least, defensible on rational grounds.

The integrity and normal arrangement of the teeth are, therefore, of importance to the general health, because of the essential part which they perform in the preliminary stages of food preparation for its digestion.

Interference with the function of mastication is by no means the only menace to bodily health, which results from interference with the integrity of the masticating mechanism. Where the teeth are irregularly placed so that their relations to each other are abnormal, or where the symmetry of the whole denture is disturbed by conditions which interfere with the normal development of the teeth in the jaws in their relations to each other, the tendency towards habitual mouth breathing often arises, especially in the case of the growing child, and when the habit of mouth breathing is formed, the lateral

pressure of the cheeks upon the sides of the upper dental arch tends to make it narrower with a corresponding narrowing of the nasal passages, so that breathing in the normal way through the nose becomes increasingly difficult and often ultimately impossible.

Mouth breathing resulting from narrowing of the upper dental arch and the nasal passages promptly leads to enlarged and infected tonsils, adenoid growths, contracted chest walls and nutritional disturbances due to imperfect oxygenation of the blood. The whole bodily tone of the habitual mouth breather is weakened, and those who have made careful study of the problem call particular attention to the mental dullness of mouth-breathing school children as compared with those who breathe normally.

Broadly speaking, it may be said that loss of the teeth or malposition of the teeth are conditions which impair bodily health mainly by interference with the general nutrition of the body, of which they are the primary cause.

Irregularities in the position of the teeth are a source of interference with bodily health, not only because they constitute a defect in the masticating mechanism which reduces its efficiency, but because of the nervous disturbances to which they give rise. When the teeth erupt normally the development of the dental arches and the arrangement of the teeth in their normal positions and relations to each other, is a natural physiological process which is attended with but slight discomfort and but little nervous irritation. But when the teeth erupt in an irregular way or are crowded into abnormal position or arrangement in badly developed dental arches, the crowding leads to what is termed impaction of the teeth, causing pressure upon and irritation of the nerve endings associated with them which, in many instances, is the cause of reflex nervous disturbances of the most serious character. Disturbance of vision, of hearing, paralysis, headache, epilepsy, hysteria, facial and other neuralgias, chorea and insanity, have all been traced to nervous irritations associated with impacted

or malplaced teeth. It is not to be understood that when an individual suffers from any of the disorders mentioned, it is to be assumed that the disorder is necessarily of dental origin, but, under certain predisposing bodily conditions, it has been found to be quite possible for a dental disturbance to express itself in a reflex way by the production of any of the disorders named in this category, and both medical and dental literature furnish records of abundant examples of the direct connection between dental and oral disorders and serious disease conditions in different organs and tissues of the body. It is, therefore, of the utmost importance that in all cases where the teeth show a tendency to erupt in irregular position, or, where teeth which should erupt fail to do so, the proper treatment for the correction of the fault should be instituted, as all impacted teeth are sources of irritation which may and generally do, in the course of time, set up nervous disturbances which too frequently have their unsuspected origin in dental irritation, and which if unrelieved, may produce the most serious consequences. These nervous reflex disturbances from crowded or impacted teeth are most likely to manifest themselves in childhood, but no period of life is exempt from the possibility of their occurrence.

We have considered thus far the damage which comes to the masticating mechanism through loss of the teeth or their malposition, and some of the nervous phenomena incident thereto, and the effect of this disturbance of the masticating mechanism upon the general health of the body. We have now to consider a vastly more important aspect of the problem, namely, the manner in which damage to the masticating mechanism is most commonly brought about through the infection of the human mouth by disease-producing microorganisms.

It is now more than a quarter of a century since the germ origin of disease was firmly established upon a foundation of scientific demonstration, and though for centuries it had been suspected that certain forms of disease were due to the agency

of certain kinds of "germs," so called, it was not until the latter decades of the nineteenth century, through the labors of Robert Koch, Louis Pasteur and others, that the demonstration of the soundness of the theory was actually made, since which time the great science of Bacteriology has come into being, and we are in possession of the data which are enabling us to treat diseases upon a rational basis with full knowledge of their causation. About 1880, the late Professor W. D. Miller, of Berlin, began a series of studies of the bacteria which he found in the human mouth, and in the course of his investigations he was able to identify between sixty and seventy varieties of micro-organisms, which were more or less constant inhabitants of the human mouth, of which number a considerable percentage were found to be the exciters of disease conditions, either in the mouth itself or in more remote parts of the human body. As the result of his investigation, and the studies of those who have followed in the same line of research, the fact has been definitely established that the mouth is the portal of entry for nearly all of the germs which set up disease manifestations in the human body, and not only that, but that the mouth itself furnishes ideal conditions under which these disease-producing organisms can flourish and reproduce themselves, and that the mouth is, therefore, a sort of incubator for the growth of bacterial forms which are a constant menace to the health of the individual whose mouth is so infected.

The most obvious and, it may be said, dramatic expression of bacterial activity in the infected mouth is the destruction of the masticatory apparatus by the disease known as "dental caries" or tooth decay, a disease which affects the human race almost universally, and which is most active in the mouths of children of school age and up to the time of maturity. Statistics carefully compiled in nearly all civilized countries show that about ninety-five per cent of children of school age suffer more or less from the destructive process of tooth decay. Viewed simply as an interference with the integrity of the

masticating mechanism and consequent injury to health of school children, tooth decay is not by any means the unimportant factor that it is popularly considered to be. So commonplace is the disorder that our familiarity with it has tended to breed a dangerous attitude of contempt toward it as one of the minor ills, like the less dangerous diseases of childhood which we have come to regard as a part of the necessary experience of youth, whereas, investigation has very clearly shown that not only is the nutrition of the child seriously impaired by the interference with mastication which results from tooth decay, but that coincident with the carious process and as a sequel thereto, a variety of bodily infections, causing profound disturbances of the nutrition of the child, as well as acute and chronic nervous disorders, occur as the direct consequence of the process of tooth decay.

Quite apart from any damage which may come to the teeth themselves from an infected mouth, such a mouth is a constant menace to the health of the individual. We all understand very clearly, indeed it is a matter of common knowledge, that food which is infected should not be taken into our bodies, and we all take particular care to see to it that not only is the food that we eat not infected, but that it is kept in clean containers, and that it is served to us upon plates and dishes and eaten with utensils which are also not infected, and yet, a great many people who are scrupulously careful about seeing to it that the food which is served to them is clean and free from germ infections, pass that food into mouths which are infected and uncleanly, and they masticate their food with teeth that are germ-laden and which constantly infect every morsel of food which passes into their stomachs, thereby not only infecting the whole digestive tract, but the germs in this infected food set up fermentation and putrefactive changes in the food itself, generating poisonous substances which ultimately pass into the blood stream of the individual, thus bringing about a chronic, slight blood poisoning, which damages the bodily health to a degree which often,

in the course of time, makes the individual susceptible to acute attacks of disease.

Tooth decay is a germ disease caused by certain bacteria which have the power to decompose starchy food and, in the process of decomposition, to generate acids which attack the hard structure of the tooth, dissolving it and finally causing it to waste away in circumscribed localities until the central cavity or pulp chamber of the tooth is reached and the pulp or "nerve," as it is commonly called, is exposed, then infection of the pulp follows, resulting in an acute inflammation, which expresses itself as what is commonly called "a jumping toothache." The pulp finally dies and undergoes putrefactive changes, during which process poisonous substances are formed that find their way into the tissues of the socket of the tooth, by which means direct access to the tissues of the individual is made possible for the invasion by disease-producing germs. This local infection of the tissues may and often does lead to infections carried by the blood stream to various remote tissues and organs of the body. Perhaps the most important example of the disease-producing germs which find their way into the tissues of the body through the cavities of decayed teeth and thus through the pulp chamber of the teeth into the bony tooth socket of the jaw, is the tubercle bacillus. Tubercular infection of the jaw bone and of the lymphatic glands of the neck, due to invasion of these structures through the root canals and alveolar sockets of decayed teeth, is of quite general occurrence, and in susceptible individuals these foci of tubercular infection often involve more distant bodily structures. The literature of the subject abounds in reports of tubercular infections having their origin in defective tooth structure. Of almost equal importance, so far as its destructive character is concerned, and, likewise, its general relation to the health of the individual, is that destructive inflammatory process which attacks the tissues which retain the teeth in their sockets and destroys them, known commonly as "Riggs' Disease" or pyorrhea alveolaris. This disease, if allowed to

proceed unchecked, results eventually in the loss of the teeth by destruction of the tissues which support the teeth in their sockets, but loss of the teeth by this method is not the only or most important damage to the individual which the disorder is capable of bringing about. The disease itself is caused by the invasion of the supporting tissues of the tooth by an organism or organisms, which set up an inflammatory process characterized by the production of pus, and the destruction of the vitality of the tissues which are thus affected. Until comparatively recently, but little, if anything, definite was known in regard to the nature of the micro-organisms which are responsible for initiating this destructive inflammatory process, but within the past year, Dr. Allen J. Smith and M. T. Barrett, of the University of Pennsylvania, have been successful in isolating what they have sound reason to believe is the organism which is the exciter of this destructive disorder, and have suggested for its treatment a method which has given more encouraging results than anything that has heretofore been proposed for the cure of the disease. The importance of this discovery cannot be measured, not only because it promises to give relief to the discomfort and inconvenience which is occasioned by loss of teeth from Riggs' Disease, but more particularly, because, when the disease is once actively in progress in the mouth of an individual, the destruction of the tissues furnishes opportunity for invasion of the tissues by a variety of disease-producing organisms, which, gaining an entrance to the circulation in that way, set up serious disease reactions in many other organs and tissues of the body. Investigation has definitely shown that certain skin diseases, abscesses and various pus-producing inflammations in various parts of the body, diseases of the kidneys, liver and lungs, glandular swellings, joint affections and valvular heart diseases, have originated from the activities of disease-producing germs, which have found their way to the parts affected through the supporting tissues of the teeth, which have been the seat of Riggs' Disease, and if, as we now believe, we have at our disposal an

efficient means for the cure of this important mouth disorder, then, by reason of its power to prevent the serious and often fatal bodily infections that I have named, the discovery is one which is of the utmost importance in connection with preventive medicine. It will be seen then that a sound and normally arranged set of teeth involves questions of more than local importance, that is to say, with respect to the teeth themselves, and that a clean mouth is not only desirable for esthetic reasons, but is a necessity from the right viewpoint of bodily health. Damage to the masticating mechanism by the loss of even a single tooth should be regarded as a calamity, but, of even greater importance is the incidental damage to health occasioned by the disease process which has led to the ultimate loss of the tooth. Ordinarily, loss of the teeth is the final result in a long-continued process of disease due to germ infection, and coincident with this local expression of disease activity, there is proceeding a continuous infection of the body, having its origin in the infected mouth, which may at any time, under favorable conditions, light up an attack of acute disease in some more or less remote or possibly vital structure and become a serious menace to health, if indeed it may not end fatally; or, on the other hand, the individual is subjected to the dangers arising from a continuous absorption of small quantities of poisonous matter, originating in the infected mouth, which, if long continued, results in chronic ill health due to blood poisoning.

It is evident then that the means of prevention of the class of disorders which we have here had under consideration, is constant and unremitting care in keeping the mouth in a clean and relatively uninfected state. It is impossible to lay down definite rules for the guidance of each individual in the matter of maintaining mouth cleanliness. The nutritional conditions in individuals vary considerably, and in some cases the mouth requires more constant care than in others. In the use of a reliable dentifrice at least once a day, and the brushing of the teeth thoroughly after each meal and particularly after the

last meal of the day, the use of waxed floss silk to cleanse the surfaces of contact between the teeth, and the occasional use of a mixture of lime water and hydrogen dioxide should be sufficient for the ordinary individual care of the teeth. This individual care should be supplemented by periodical inspection by a competent dental practitioner as a precautionary measure, and for such special treatment as his judgment may dictate. The suggestions which I have here given for the care of the teeth themselves would be quite inadequate and relatively useless in securing a thoroughly clean mouth were the other tissues of the mouth cavity overlooked. Not only the teeth themselves, but all of the mouth tissues should be cleansed thoroughly at frequent intervals, that is to say, the tongue, the lips and the surfaces of the gums should be brushed over with a soft brush that has been dipped in the lime water and hydrogen dioxide solution in order to dislodge all deposits upon their surfaces. The dorsum of the tongue particularly is liable to become coated or "furred," as it is called, which coating consists largely of food débris, thickened mucus, epithelial scales, which are shed off from the surface of the tongue, all infected with bacteria and undergoing fermentation or putrefactive changes. If the teeth alone are cleansed, re-infection of their surfaces would rapidly follow if the tongue and other mouth tissues were not germ free. Thorough cleansing of all of the mouth surfaces and careful rinsing of the mouth afterwards in order to remove all accumulations, should be made an important part of the routine of the daily toilet of the mouth. By keeping the portal of the body free from germ invasion we secure for ourselves the best safeguard against germ disease. Modern scientific research is tending to demonstrate more and more the truth that a healthy mouth is the best kind of life insurance.

GIORDANO BRUNO

By Edgar Arthur Singer, Jr.

Professor of Philosophy, University of Pennsylvania

The straightest way to the heart of old matters is an old letter. Here is one written on the twenty-third of May, 1592, by a gentleman of Venice to the Father of the Venetian Inquisition.

"Very Reverend Father and Most-to-be-observed Sir:

"I, Gioanni Mocenigo, son of the Clarissimo Messer Marcoantonio, compelled by my conscience and ordered by my confessor, denounce to Your Very Reverend Paternity Giordano Bruno of Nola, whom I have heard say on various occasions when he was conversing with me in my own house, that Catholics do but blaspheme when they hold the Bread to be transubstantiated into the Flesh; that he is against the Mass; that no religion satisfies him; that Christ was a charlatan who, since he resorted to tricks to fool people, might well enough have foreseen that he would die a criminal's death; that there is no distinction of Persons in God; . . . that the world is eternal and that there are an infinite number of worlds, and that God is continually making an infinity of them because He wants as many as He can have; that Christ performed specious miracles; that he was a magician and the apostles were magicians too." . . .

The letter runs on in breathless denunciation, but already one begins to make out the image of Bruno reflected in the average mind of his time. The limited intelligence of Mocenigo has honestly misunderstood some of Bruno's utterances, his malice has distorted others; but the perversity of the whole is not due to these faults of detail. Lost in this mumbo-jumbo of stock heresies lies hidden a great idea, the greatest perhaps

that has ever been contributed by a single mind to the cause of our science. "And he says the world is eternal and that there are an infinity of worlds." This sentence has brought the old world to an end, has shattered the heavens under which Christendom was then living, yet it falls on the ear of its time with no more meaning or portent than a doubt respecting the doctrine of transubstantiation or the authenticity of miracles. Bruno, throughout the course of his driven life and up to the moment of his tragic death, knew most forms of martyrdom. He bore none of these meekly, for his was a lusty soul that did not love to suffer. But neither the hatred nor the cruelty of his world seems to have hurt him so to the quick as did its stupidity. Doubt him and hate him if you will; but value him you must! He was master of a great idea and unacquainted with modesty.

Meanwhile Mocenigo has more to say of this sinner: "He has expressed the intention of making himself the founder of a new sect under the name of the new philosophy. He has said that the Virgin could not have brought a child into the world, and that our Catholic faith is full of blasphemies against the majesty of God; that it would be better to suppress the fees and perquisites of friars because they befoul the world; that they are all asses and that our common opinions are the teaching of asses; that we have no proof that our faith has merit with God; that the simple rule of not doing unto others what we would not have them do unto us is sufficient for right living. . . ." Perhaps I may stop here. Evidently one who could be guilty of all these follies would be ingenious in inventing others, and Mocenigo's letter may run endlessly on.

While this letter was writing, Bruno lay locked in a room of Mocenigo's house. "I had thought to learn from him," Mocenigo explains, "not knowing him to be the wicked man he is, and having noted all these things to lay before your Very Reverend Paternity, and fearing that he would take his departure as he said he wished to do, I have locked him in a room at your disposal. As I think him possessed of the devil, I hope you will decide quickly what is to be done with him. . . . "

It has sometimes been wondered how Bruno came to accept the invitation of Mocenigo to take up his residence in Venice. Italy was for him a place of such peril that it seems incredible he should have ventured to set foot in it. "Tell me one thing more," concludes a letter written in this same year 1592 by a gentleman of Bologna to a friend in Padua, "tell me one thing more. Giordano Bruno, whom you knew at Wittenberg, the Nolan, is said to be living among you just now at Padua. Is it really so? What sort of man is this that he dares to enter Italy, which he left in exile as he himself used to confess? I wonder, I wonder. I cannot yet believe the rumor, although I have it on good authority. You shall tell me whether it is true." And history has wondered all the more seeing that Bruno himself had long before prophesied the result. "Torches," he had written, "fifty or a hundred, will not fail me though the march be at noonday should it be my fate to die in a Catholic country."

So far as documents furnish any answer to this question, it lies suggested in a second letter written by Mocenigo to the Holy Inquisition two days after the denunciation. "In the course of the day that I kept Giordano Bruno locked up, I asked him whether the things that he would not teach me, as he promised to do in return for the many kindnesses I had done him and the many gifts I had given him, whether he would not consent to teach me them if I abstained from denouncing him for all the criminal things he had uttered to me against our Lord Jesus Christ and against the Holy Catholic Church. He answered that he did not fear the Inquisition, for he had harmed no one by living in his own way, and moreover he could not recall having said anything sinful, but that if he had said such things he had said them only to me, and he need not fear that I would do him harm in the way I suggested." Those who can may believe that Bruno is here telling the truth about himself. Those who can may believe that he who eight years before and at a safe distance from Italy had so clearly seen the torches that awaited him there, had since grown blind to them or indifferent.

For my part I suspect that the truth lies written between the lines of our documents, and shall return later to look for it there.

The next document of the trial is brief enough. Under date of the following day—that is Tuesday, the twenty-sixth of May—is found this entry: "Clarissimo Dom Aloysius Fuscari presiding. Presented himself Dom Mattheus de Avantio, Captain of the Constabulary, and reported as follows: Sabbath at three o'clock of the night, I arrested Giordano Bruno of Nola, whom I found in a house over against Saint Samuels, in which dwells the Clarissimo Ser Gioanni Mocenigo, and I have imprisoned him in the prisons of the Holy Office, and this I have done by order of this Holy Tribunal."

The doors of the prison thus closing on Bruno bring to an end the story of his life, but from behind these doors there come to us fragments of the story itself as Bruno retells it to his judges. For on the very day of his arrest he is examined by a tribunal composed of the Apostolic Nuncio, the Patriarch of Venice, the Very Reverend Father Inquisitor. Before these, as the clerk of the tribunal records it, was brought a certain man of ordinary height with a chestnut beard, who, when he had been admonished to speak the truth, and before any question could be put to him, burst out of his own accord: "I will tell the truth. Several times have I been threatened with being brought before this Holy Office, but I have always taken the threat for a joke, because I am ever ready to give account of myself." Whereupon he tells how, having found himself at Frankfurt the previous year, he received there two letters from Gioanni Mocenigo, inviting him to come to Venice to instruct Mocenigo in the art of memory and the art of invention, for which this Venetian gentleman had promised to pay him well and treat him in a way that should content him. And so Bruno had come to Venice seven or eight months before, living first in lodgings, then for a brief space in Padua, until some two months prior to his arrest he had taken up his residence in Mocenigo's own house. We already know how, "compelled by his conscience

and ordered by his confessor," Mocenigo finally disposed of his guest.

Then Bruno, questioned by the tribunal, laid before it a formal account of his life. "My name is Giordano Bruno, of the family of the Bruni, of the city of Nola, twelve miles from Naples. In this place I was born and raised, and my profession was and is letters and the sciences. My father was named Gioanni, and my mother Fraulissa Savolina, and my father's calling was that of a soldier. He is dead since, and my mother too.

"I am about forty-four years of age, and I was born, so far as I have heard from my people, in the year 1548. I remained in Naples learning the humanities, logic, and dialectics until fourteen years of age . . . and then I took the habit of Saint Dominic in the monastery or convent of Saint Dominic in Naples, and was invested by a Padre who was then prior of that convent, called Maestro Ambrosio Pasqua. When the year of probation was passed, I was admitted by him to profession, which was solemnly made in the same convent. . . . Later I was promoted to holy orders and at the usual season to the priesthood. I sang my first mass in Campagnia, a city of the same state at a distance from Naples, residing the while in a convent of the order, the San Bartholomeo, and continued in the religious habit of Saint Dominic, celebrating masses and the divine offices, obedient to the superior of the Order and to the priors of the monasteries and convents where I was stationed until 1576. . . ."

I have not wanted to interrupt Bruno, nor to hurry him in his story, tedious as it is in the telling. Little event after little event of his secular and of his religious life befalls with the trivial monotony of dropping rain. But is it not just so that these little events and endless others like them must have fallen on the soul of the living Bruno, soaking in, soaking in, unnoticed as rain, until his very humors ran with their humor? Now their humor was the spirit of the old world, the spirit of his Father's House. Would it not be curious if, having pulled

down this ridiculous old dwelling and in the very act of dancing among its ruins, Bruno should suddenly come to see that it was the only house his soul, being such a soul as it was, could dwell in? If something of this kind did not happen at a moment of his life we are fast approaching, then only the gods know what did happen. But I am anticipating, or rather laying up reflections against our hour of need. For the moment we have no more than come to the day in Bruno's life when he stepped out of his Father's House to make his way *ins Freie hinaus*.

Fifty years ago, before Berti had unearthed the documents of this trial, it was difficult to trace the life of Bruno. Since then it has become well-nigh impossible. Documents are a great embarrassment to the conscientious historian. They are there, these documents, and have to be put in the text; the truth about the case must be relegated to the foot-notes. Now the text runs in this wise: "In 1576 . . . I was in Rome at the Convent of Minerva, obedient to the orders of Maestro Sisto de Luca, Procurator of the Order. Thither I had gone to present myself because at Naples two processes had been instituted against me, the first for having given away certain images of the saints and retaining only a crucifix, it being thought that this showed a lack of respect for the images of the saints; and the other for having said to a novice who was reading a story of the Seven Beatitudes in verse, What did he think he was doing with a book like that?—why didn't he throw it away and read rather some other book, as the lives of the Holy Fathers? This process was renewed at the time I went to Rome, with other articles added to it which I do not know, for I abandoned the order and threw aside the habit and went to Noli in the region of Genoa, where I supported myself four or five months teaching grammar to young boys."

This is indeed the text, but is not a comment inevitable? What! Bruno would have us believe that in 1576 he is of such fearful mood and timid temper that, having no more on his conscience than the events recited, he abandons church and country, peace and security at the mere frown of his Order, but

that in 1592, having in the meanwhile upset, smashed, and abused the Christian world, he can look upon the Inquisition without fear, bethinking him that he had harmed no man by living in his own way?

However, flee he did. What followed on this flight he recounts to his judges as his trial proceeds. Sixteen years of as hard-driven a life as one could wish for one's dearest foe, from Italy to Switzerland (to the Geneva of Calvin's day, where one may imagine that Bruno was as much at home as fire on an iceberg), then across to France, from Lyons to Toulouse, from Toulouse to Paris, from France to England, from London back to Paris, then hastily to Germany, through many German and Bohemian cities! Sixteen years of homeless, friendless poverty, now teaching small boys, now lecturing at great universities, now living with fine gentlemen, received of a king or of a queen, now gathering a few curious students about him, who somehow confused the promise of the great idea with old mysteries and the arts we call black. Until at last we find him at Frankfurt receiving Mocenigo's letters promising him a home in Italy, his native land, and a treatment that should content him.

Yet these years of travail were those in which his works were written, the Italian dialogues in England, the Latin poems in Germany. The great idea had received full expression, the "Excubitor," as Bruno called himself, the Awakener of sleeping minds, had blown his trumpet and the walls of the world had fallen. Splendid is the enthusiasm with which Bruno first announces this new vision of the morning: "Lo! here is one who has swept the air, pierced the heavens, sped by the stars and passed beyond the bounds of the world, who has annihilated the fantastic spheres with which foolish mathematicians and vulgar philosophers had closed us in. The key of his diligent curiosity has opened to the view of every sense and every power of reason such closets of truth as can be opened by us. He has stripped Nature of her robe and veil. He has given eyes to the mole, vision to the blind. . . . No longer is our reason imprisoned within the confines of imaginary heavens. . . .

We know that there is but one heaven, one immense ether, where magnificent fires maintain their proper distances by reason of that eternal life in which they have part. These flaming bodies are the ambassadors which announce the excellence of God's glory and majesty."

This is indeed the voice of an Awakener. But, alas for awakeners! the vision of the morning is never fair to those just shaken out of their dreams. In an introductory letter to the last of the dialogues we catch an echo of the sleepers' complaint: "If I shoved a plow, if I kept a flock, if I cultivated a garden, if I mended old clothes, no one would notice me, few would consider me, not many would find fault with me, and I could easily please everybody. But for having been studious of the field of nature, solicitous for the pasture of the soul, enamored of the cultivation of the mind, a very Daedalus fashioning raiment for the intellect, every passer-by threatens me, everyone who sees me attacks me, who comes upon me rends me, who lays hold on me devours. It is not a few; it is many, it is almost all. If you would know why this is, I will tell you the reason of it—I despise the crowd, I hate the mob, the multitude contents me not. One thing I love, one thing for whose sake I am free in bondage, content in pain, rich in poverty, alive in very death. One thing for whose sake I envy not those who are slaves in their liberty, troubled in their pleasure, poor in their riches, dead in their life. Their body is the chain that binds them, in their mind is the hell that tortures them, in their spirit the falsehood that makes them sick, in their soul the lethargy that kills. Not theirs the greatness of mind which frees, the breadth of view which ennobles. Not theirs the splendor which illumines, nor the science which gives life." It is a brave, even an over-brave flourish with which Bruno ends this proemial epistle: "And so the gods deliver me from all those who unjustly hate me, and so my God is always propitious unto me. . . . The stars make my sowing fit the field and the field my sowing, so that the world is made content with the useful and glorious fruits of my labors. . . . And if I err, I

truly do not believe myself to err; whether speaking or writing, I do not dispute for the love of victory . . . For love of true wisdom and desire for true insight I exhaust, I crucify, I torture myself. . . ."

Brave is the flourish, how over-brave we realize with unexpected intensity as we follow this solemn trial to its last scene. Having recounted the episodes of his life, Bruno proceeds to the explanation and defence of his teachings. At first the new philosophy is presented with no little boldness and confidence, its difference from the formal teaching of Christianity admitted and even pointed out. But always with a certain reserve, as of one who would say, "Yes, I have broken the frame and destroyed the flesh of your religion, but if you will let me, I will show how much more nobly its divine spirit dwells in the new body I have made for it." Now this new body differs in no important way from the physical universe as we see it today, so that Bruno's problem has been the problem of all Christian thought since his time. What Aquinas had done in the way of making the spirit of Christianity at home in the finite heaven-enclosed world of Aristotle, that Bruno felt must be done over again, now that the world was no longer finite and the distinction between Heaven and Earth had vanished. This is the thought that pervades the first days of Bruno's account of himself before the Venetian tribunal, but as one by one the accusations of Mocenigo's letter fall on him, he seems to lose hope and confidence in himself. He denies, and denies, and denies!

I am not convinced that he is telling the truth in these denials. I am not convinced that Mocenigo's account of him, barring a few obvious misunderstandings, is false in spirit. No more am I convinced that Bruno has been frightened into lying himself out of danger. He seems to me to say, "Alas! if these matters on which you question me are of the essence of Christianity, then have I been wrong in supposing that the old wine can be put in the new bottle." Driven and perplexed, he has to decide which lies nearest to his heart, the new bottle or the old wine. Remember him fleeing in his early manhood from his

Father's House, ostensibly in childish fear and unwillingly, but really perhaps because he needed space, endless space, through which to follow the new idea. Remember him coming back to Italy sixteen years later, ostensibly because he realized that his manner of living and thinking had hurt no man and so ought to bring down no judgment on his head, but really perhaps because the craving for the old wine was deeper in him than the enthusiasm for the new bottle. Perhaps then we can understand the closing scene of his trial at Venice. "It may be," he cries, "in the long time that has passed I have committed other sins and departed from the Church in other ways than those which I have explained, and that I have not cleansed myself of all matters of censure, but although I have thought much over these things, I can recall nothing more. I have confessed, and I now confess anew my errors, and I am here in the hands of Your Most Illustrious Lordships to receive punishment for the saving of my soul. My soul cannot express the depth of its contrition for my fault." And falling on his knees, he said: "I humbly ask pardon of the Lord God and of Your Most Illustrious Lordships for all the errors which I have committed and which I now stand ready to expiate in such wise as your wisdom may think proper and judge expedient for my soul. And moreover, I beg that you give me a punishment which shall exceed in severity rather than set any public example which may throw dishonor on the sacred religious habit which I have worn. And if by God's mercy and the mercy of Your Most Illustrious Lordships, life shall be spared me, I promise to make such notable reform of my life as shall pay for the scandal I have given with equal and greater edification."

In this unhappy posture I leave Bruno the man to take up the story of his great idea. We shall see him once more indeed, at the moment when, eight years later, he calmly dies for the idea he now so abjectly abandons; but no understanding of the alternating enthusiasm and despair that filled this life can

afford to neglect the qualities of the gospel it stood for, forsook, then died for in the end.

Like all very great ideas, this one is of the simplest. It begins with the observation that the flame of a candle grows bigger as we approach it, smaller as we recede from it. Nothing very new in this, you say, nor very imposing. No, it is the next step that was so new in Bruno's day, and of such tremendous destructive and creative power. Yet it is just as simple as the first. What is true of a candle flame must be true of a sun and of a star. Is it not indeed simple? Yes, but in all the long while the world had lasted it had occurred to no one before Bruno to seize upon this simple idea and to follow whither it led. It led far, wonderfully far. It led Bruno to journey in imagination out and out toward those most distant stars that were then called fixed, and were indeed supposed to be fixed in one great sphere that enclosed all things, beyond which was nothing, and not even nothing, for there was no beyond; space ended where matter ended, at the walls of the world. But Bruno as he journeyed saw this great sun of ours growing smaller and smaller as he receded from it, and yonder star growing larger and larger as he approached it, until the most wonderful thing happened. The sun began to look more and more like a star, the star more and more like a sun. There was now no escaping the conclusion—the stars that had been called fixed are other suns, our sun but a near-lying star.

A child might have grasped this idea which brought a world to an end. Do I say a child? It may be that Bruno was that child, for his mind throughout had much of the waywardness, something of the random and tumultuous association of a child's mind. The past might interest him, might even inspire him; it never had the power of capturing and holding him. But childish as it was, this idea did destroy the old world, for if stars were in no wise different from the sun we know, nor the sun from a star, evidently there was at least one star that was not fixed to the ethereal sphere that contained all things. There could then be no longer any motive for supposing these other

suns to be all at the same distance from the center. They might be anywhere, they might even (Bruno had this very modern idea) be moving, with respect to each other. Inevitably Bruno must come to look upon the stars as suns sprinkled irregularly throughout the regions of infinite space.

Nor was this all. Coming after Copernicus as he did, Bruno had from the first grasped with enthusiasm Copernicus' idea that not the Earth but the Sun was the center of the sphere. I say the center of the sphere, for we must remember that Copernicus never touched the boundary of the world, but only changed its center from Earth to Sun. In Copernicus' thought we still lived within a star-spangled heaven. But now that Bruno had shattered this heaven and sprinkled these stars through space, he could not well help surrounding those other suns with planets, until not merely an infinity of suns but an infinity of solar systems spread themselves out before his imagination. But could he stop here? When one has once destroyed the distinction between Heaven and Earth, when one has once begun to think of nature as everywhere alike, it is not easy to stop. Was not one of the planets making its journey around our sun inhabited with manifold forms of life? Then why should they not all be? And is it likely that one solar system should be a scene of life and the infinity of others not? So it was that Bruno, looking out into space, saw as many inhabited globes as there were "hundreds of thousands of stars."

These are the matters which Bruno brought back with him from his journey to the stars and beyond the confines of the world. I have told them simply, for eloquence is wasted in describing such feats of the imagination. They are of themselves eloquent. Yet we recall with what enthusiasm Bruno himself recounted his journey. Is it not possible, however, that when he returned to earth and told of his journeyings to men, he came to perceive, as these men at once perceived, that his new vision was not all made of beauty? Is there not in this infinite cosmos that which may depress and even terrify?

In his "Garden of Epicurus," Anatole France has put the two worlds side by side. One has only to do this to feel that Bruno, who at first held out his hands to the new vision, may afterwards have snatched them back again to shut it out.

"We have some trouble," says France, "in imagining the state of mind of a man in olden times who firmly believed that the Earth was the center of the Universe, and that all the stars turned round it. He felt under his feet damned souls writhing in flames, and perhaps he had seen with his own eyes, and smelled with his own nostrils the sulphurous fumes of Hell escaping from some fissure in the rocks. Lifting his head he contemplated the spheres, . . . those bearing the Moon, Mercury, Venus—the one that Dante visited on Good Friday of the year 1300—the Sun, Mars, Jupiter, Saturn, then the incorruptible firmament from which the stars were suspended like lamps. Beyond, his mind's eye discerned the Ninth Heaven to which the saints were rapt, the Primum Mobile or Crystalline; and finally Empyrion, dwelling of the blessed, toward which, he firmly hoped, two angels robed in white would bear away, as it were a little child, his soul washed in baptism and perfumed with the oil of the last sacraments. In those days God had no other children than man, and all his creation was ordered in a fashion at once childlike and poetic like an immense cathedral. Thus imagined, the universe was so simple that it was represented in its entirety with its true figure and motions in certain great clocks run by machinery and appropriately painted."

But now! "We are done with the spheres and the planets under which one was born lucky or unlucky, jovial or saturnine. The solid vault of the firmament is shattered. Our eye and our thought plunge into infinite abysses of heaven. Beyond the planets we discover no longer the Empyrion of the elect and of the angels, but a hundred millions of rolling suns escorted by their cortège of obscure satellites invisible to us. In the midst of this infinity of worlds our own Sun is but a bubble of gas and our Earth but a fleck of mud."

The contrast speaks for itself and needs no comment. It is

enough to point out the effect it must have had upon the ethical and religious notions of him who first realized it. What in such a world are we to make of the central episode of Christianity? Bruno's imagination that had swept through space and sped by the stars had found these worlds inhabited by beings "perhaps better, perhaps worse than we are." If there was no evidence that these dwellers in distant solar systems were so much better than we as to need no saving, neither was there any evidence that they were so much worse as to deserve none. We were no longer the only children of God. What then? Are we to suppose that the drama of redemption is being enacted over and over again throughout the infinity of worlds? Is the Son of God being sacrificed over and over again for the sake of His other children? Is He at this moment perhaps redeeming with His life the dwellers on some star in the night yonder?

But destruction did not stop here. Not only the gentler aspects which Christianity had given to the sterner religion of pagandom were threatened. That older religion itself, with its well-thought-out theory of the relation between God and man must either be rejected or remodeled. For Aristotle as well as for Aquinas, God and man had formed the real plot of the universe. God, revealing Himself most clearly in the turning of the enclosing heaven, set thereby the rest of nature in motion and stirred things down to their very center. So that in the region of earth, water, air and fire there came to be composed bodies mixed of all of these. They were the living beings we know, which, holding their ingredients in proper proportion for a while, fell apart again and passed away.

These living beings differed in power. As we pass from the vegetable through the animal to the human they show themselves increasingly able to control the matter in which and of which they are. Highest of all is the human male. It is for the sake of producing him that the mechanism which fills the region between Heaven and Earth exists and is operated. One might almost say that Nature is God's worskhop for producing man. But why should God be thus interested in producing

this particular kind of animal? Aristotle's answer comes less clearly than one could wish, yet it comes. It is because man differs from the animals not only in degree but in kind. He is not altogether animal. In his superior body there is contained a soul which is not only of God's making, but of God's very substance. That is why man alone can know God. It is as though God needed to be known, recognized, reflected as in a mirror. As for man, he is a bit of divinity momentarily estranged from his home and dwelling, but with the privilege of returning thither can he but free his soul from earthy and sensuous entanglements and interest himself in knowing his Father which is in Heaven.

And now that Bruno has destroyed this difference between Heaven and Earth, has he not destroyed along with it the distinction between God and man? Has not his infinite homogenous world left man a mere mite shivering on his fleck of mud as it rolls around its bubble of gas? Man is no longer the center of interest; he no longer plays an important part in any thinkable plot. "Man is no more than an ant in the presence of the infinite," cries Bruno. "A star is no more than a man."

We can quite understand that Bruno's awakening, with however great an enthusiasm it may have been heralded, can be no pleasant awakening for the sleeper. The world of his dreams was infinitely fairer and warmer than that reality to whose garish light his eyes have been opened. It cannot be expected that the awakened should feel any gratitude, and he did not. But what is less obvious is the matter of Bruno's own feeling as the consequences of his new idea gradually unfold themselves to him. Can that first enthusiasm be sustained to the end, or must he too shrink before the fuller vision of what he has done?

If we were to classify men in terms of their reactions to new ideas, I think we should all hit upon these three types. Let me call the first the radical. He is easy to initiate into a new truth, bold to accept it at all costs, loses at once all perspective and sees in the past only a bundle of errors without beauty and

with no other interest than to furnish matter for jest. And then there is the conservative. The hold that the past has on such a mind is sometimes enormous. He is capable of clinging to it at the expense of all the rest of his science and experience. If it has enthralled his heart and imagination, he falls into a mood which the Renaissance called the acceptance of "two-fold truth." He believes against all evidence. He believes as Anselm had it, "just because the thing is absurd." He insists with Pascal, that the heart has its reasons which the reason cannot understand. He is a creature of faiths and of mysticisms. Finally there is the philosopher, the only one of the three completely made for unhappiness. He gets no thrill from novelty. He has followed human thought through too many revolutions to expect the most violent of cataclysms to change things much. He struggles to keep his perspective as he would keep his reason, and the views of older humanity do not lose their beauty because their expression has been proved wrong. Required to readjust his thought of yesterday to the new fact of today, he undertakes the task cheerfully enough as part of the day's work. That is what yesterdays, todays, and if it may be, tomorrows are given to him for. He measures his success by the extent to which he can mold new thought to the satisfaction of old desire, to old desire newly instructed.

And Bruno—to which of these classes does he belong? Is he the radical who would light-heartedly take his place on the fleck of mud and watch it roll around its bubble of gas, while he laughs at his neighbors, who in the face of such a universe hypnotize themselves into a continued faith that they are somehow divine souls in whom a God of Heaven is interested? Or will he, on the other hand, become one of those thus hypnotized by the past? Will the awakener, now himself fully awakened, try to snatch at the fading dream and somehow manage to keep his faith in what he knows can't be true? Or will he set laboriously to work, as a philosopher should, to find that interpretation of the new facts which lies closest to the meaning, though it may differ from the verbal expression of

world-old desires and longings? Alas! if Bruno would but make up his mind to be any one of these three, the task of his biographer would be easy. But the real Bruno, the Bruno who mocked, who thought, who recanted, and who died, was not a type. He was a man, and as he was the most human of men, he gathered the greatest possible number of inconsistencies to his heart. Yes, he was a radical who mocked and jeered. Yes, he was a philosopher who labored and who thought. And yes, finally, he was a mystic who could hold as a splendid if inexplicable possession of his faith, all the things his reason showed to be impossible. I have shown you Bruno's mockery reflected in the somewhat muddy and turbid medium of Mocenigo's denunciation. I have shown you Bruno the mystic, kneeling before the Inquisition, completely abandoning the great idea. It remains for me to show Bruno the philosopher, Bruno the Pantheist, Bruno the unacknowledged inspiration of much that is recognized as great in Spinoza and Leibnitz, the acknowledged and highly honored forerunner of much we take to be greatest in the German Idealism that centers about 1800.

We left the great idea at the moment when, having pierced the heavens, it had come to realize the consequences of its act. The gentle meaning of Christ, the sterner pagan wisdom of God and man had been lost in an infinity that knew no enclosing heaven, in a dreary waste of sameness that knew no distinction, not even that between man and God. Bruno the philosopher was not one to let this work of scientific devastation go on unchallenged. What if there were a God who could dwell just as clearly in a heaven that was everywhere as in a Heaven that was above? What if man could have an interest for and could serve this God, not because he was different in kind from the ant, but because he was, or rather in proportion as he was different in degree? Does not the life that quickens an animate thing pervade that thing? Is it not the same life which in me beckons with my finger, beats with my heart, thinks with my brain? What then if this infinite world of ours

were one great living thing made up of other living things, as our body is made up of finger, and heart, and brain, each of which in doing its own work does consciously or unconsciously the work of the whole? "Natura est Deus in rebus," This is one of the phrases Bruno found in trying to express his philosophy. Nature is God in things, or let us put it—God is the life; suns and planets, men and ants, falling rain and mounting mist are but the gestures of this life. Each thinks it does what it does for its own sake, but those who think clearest realize that the joy of their doing as well as the solace of their undoing is the part they play in working out the ideal of the whole. "And he lives in me as I live in my hand"—the phrase is Von Hofmannsthal's, the thought is Bruno's, and it is the whole thought of Bruno the Pantheist.

The end of this life is told in a letter written by one Gaspard Schopp (a converted Lutheran) to his friend Rittershausen, rector of the University of Altdorf:

"If I write to you now it is because this very day Giordano Bruno was publicly burned for heresy in the Field of Flowers in front of the theater of Pompey. . . . If you were in Rome, you would learn from each and every Italian that a Lutheran was burned, and so you would be not a little strengthened in your opinion of our savage hatred. But you must know, my Rittershausen, that our Italians do not draw a sharp line between heretics and heretics, nor do they know fine distinctions, but if any one is a heretic they take him for a Lutheran, in which simplicity I pray that God may continue them. . . .

"Now Giordano Bruno was that Nolan . . . a professed Dominican who some eighteen years agone began to doubt of transubstantiation . . . then in his heart to deny it, and likewise the virginity of the Blessed Mary. He migrated to Geneva, . . . whence, not approving himself altogether sound in his Calvinism (than which, nevertheless, nothing leads straighter to atheism), he was driven to Lyons, thence to Toulouse, from whence he passed on to Paris, where he was a professor, but extraordinarius, as he found that the professor

ordinarius was obliged to attend mass. Thence to London, where he published a little book called the 'Beast Triumphant,' meaning thereby the Pope, whom your party is wont to honor with the name of beast. From here to Wittenberg, where, if I am not mistaken, he lectured publicly for two years. Having gone on to Prague, he published there the works, 'On the Boundless,' 'On the Innumerable Worlds,' and yet one other, 'On the Shadows of Ideas,' in which he taught horrible and moreover most absurd things, as that there are innumerable worlds, that the soul passes from one body into another, . . . that magic is a good thing and permissible, the Holy Spirit is nothing but the soul of the world, and that this was what Moses meant when he wrote, 'The spirit of God moved on the face of the waters,' that the world was eternal. . . . In a word, whatever is asserted by the Attic philosophers, whatever by our older or newer heretics he (Bruno) maintained.

"From Prague he went on to Brunswick and Helmstadt, and there for a time is said to have taught. Then to Frankfurt for the publishing of certain books, and later fell into the hands of the Inquisition at Venice, whence when they had had enough of him, he was sent to Rome, frequently examined by the Holy Office that is called the Inquisition. Convicted by the highest theologians, he now obtained eighty days that he might consider, now promised recantation, now defended his points anew, now asked another eighty days; but was really doing nothing but making a fool of the Pontiff and the Inquisition.

"So that, nearly eight years after he had come before the Inquisition here, on the ninth of February in the high court of the Inquisition, there being present the Most Illustrious Cardinals of the Holy Office of the Inquisition, . . . theologians of counsel, and the secular magistrate, governor of the city, Bruno was brought in, and on bended knees heard sentence pronounced against him. And it was in this way: the story of his life was told, of his studies and teachings, and with what diligence and fraternal admonishment the Inquisition had

sought to effect his conversion, and what obduracy and impiety he had shown. Then they defrocked him, as we say, and after that excommunicated him and handed him over to the secular arm to be punished, asking that this be done with clemency and without the shedding of blood.

"While this was passing he answered nothing, except this word: 'In greater fear, perhaps, do you impose sentence upon me than I do receive it.' So taken away to prison by the governor's lictors, he was allowed a fortnight in case he should wish to recant his errors; but in vain. Today he was led to the stake. When the image of our Saviour on the Cross was shown to him as he was about to die, he turned away his head and sullenly rejected it. In great misery he thus died, and is gone, I think, to tell in those other worlds of his imagining after what manner the men of Rome are wont to treat impious blasphemers. . . ."

Surely, he came to that other world of his imagining. It is our world and he dwells among us. Little does he remember of the men of Rome, of their Illustrious Lordships of Venice, of all the toil and travail of that old life of his—hardly enough to fill an idle hour like this in the telling. But we know him easily for the unchanged soul he was. He is that one who came to us of a day and opened our eyes to new and troubling visions. "Now you are free," he said, "be glad!" He is that same one who stole back another day and whispered, "But you are afraid! Remember your father's house, how safe it was and warm." He may be there to close the eyes that have seen enough, with what counsel then, who can tell? But once he was fond of saying, "Not only he who wins deserves the laurels; but also he who dies no coward."

MODERN PROBLEMS IN THE ADMINISTRATION OF THE LAW

By David Werner Amram

Professor of Law, University of Pennsylvania

Perhaps the title of this address is misleading. The problems in the administration of justice with which we are now concerned are not modern; they have always existed, but at no period of history have they excited such a large share of attention as in our own days. Criticism of judges, of courts, of procedure, of lawyers and of the law may be found scattered through all the literatures of all the peoples of the earth who have attained some degree of what we are pleased to call civilization. Simple folk living in primitive communities unconsciously develop a system of judicature which suits their needs, to which they cling without ever thinking of criticism or change. It is only when peoples become self-conscious, when they realize that they have a history, when they begin to understand the notion of a state, that the law making, law interpreting and law enforcing functions are drawn into the sphere of critical examination.

Jack Cade was prepared to solve the problem in his day in a very simple and efficient manner. His method was to hang all the lawyers and so end all the troubles of the people together with the law that he believed to be the cause. There are some in our day who, without advocating the naked crudity of Jack Cade's method, are still in substantial harmony with it. There are some who believe that our technical and expert law courts should be supplanted by tribunals of the "people," where the "people" may plead their own causes and where the rule of common sense can again prove the superiority of the democracy. There are others who add the thought that in these courts of the "people" the judges shall be changed frequently enough to obviate all danger of their developing into intelligent experts.

They would substitute for our present system one which is based upon zeal, good intentions and rotation in office, thus insuring a constant succession of good-natured incompetents to decide the problems of fact and law which are submitted to them. The optimistic theorists who hold these views are sometimes ready to concede that the quality of the bench under such conditions would not be above criticism, yet they seem somehow to believe that simple common sense and simple goodness of intention will be found quite sufficient for a satisfactory determination of the problems of litigation. In moments of honest avowal they concede that some knowledge of law and practice is not necessarily detrimental to judicial success.

Between keeping our present systems of administration of the law without modification and abolishing them in favor of something quite different, there lie many plans of improvement. We are in a period which is trying to fix the responsibility for such troubles as exist in our administration of the law. We blame the people, the legislatures, the judges, the lawyers, the great interests, the politicians—anybody, in fact, who, not being of our group, must be considered our enemy. The fact that everybody has in turn been blamed, shows nobody is to be blamed, but that we are simply witnessing another phase of the action of the forces that create our religions, our morals, our politics and our laws. While recognizing that we can voluntarily and deliberately contribute little toward the improvement of our condition, we are nevertheless (for such is the human instinct for making conscious efforts to overcome difficulties) applying ourselves to the study of our social system, hoping to devise some methods whereby it shall conform more accurately to our needs and whereby its parts may move against each other with less friction; and those of us who are interested in the particular part of our system that produces and administers the law may well approach the subject with a very modest belief in our ability to make remedial changes, and a correspondingly profound respect for the institutions that exist and thus are justified whether we like them or not.

Public agitation in the United States on the subject of judicial reform became violent within the last fifteen years. It is difficult to find in the legal periodical literature prior to that time more than an occasional reference to the need for reform. Since that time the volume of critical literature has grown. The subject has become an almost daily matter of newspaper comment. The American Bar Association and the various state bar associations have appointed committees on law reform, on judicial administration, on legal education, and several organizations of national scope, such as the National Economic League, the American Academy of Political and Social Science and others, have seriously devoted a portion of their time and publications to the consideration of this subject of increasing public importance. The American Judicature Society, which purposes to co-ordinate the efforts of individual lawyers and of the various bar associations, was organized exclusively for research in order to improve the administration of justice. Ten years ago the subject may be said to have still been in a purely empirical stage. Criticism of defects and the remedies suggested were alike inspired by a mere uninformed desire to improve. There was no attempt at comparative study of the subject, and no attempt at anything like a scientific diagnosis of the problems. Nobody seemed to know or care that our different state jurisdictions presented the greatest variety in systems of administration of the law, and that all of these varying experiments were worthy of study and comparison. We rested content in provincial self-satisfaction until some provoking illustration of the imperfection of our system aroused us to a fury of indiscriminate reform. Thus it is that the public mind, periodically aroused by individual instances of injustice and by individual experiences of delay and high cost in the prosecution of a lawsuit, is inflamed by emotionally appealing attacks on our system of law making and law administration. Even sober lawyers are at times carried away. We heard a distinguished member of the New York bar speak of legal literature as "a great heap of worthless law books which

should be allowed to gradually moulder into dust and sink into the capacious grave of useless and forgotten literature." A hundred years ago Mr. Justice Yeates, of the Supreme Court of Pennsylvania, said that he professed "no veneration for the rubbish of antiquity resting on foundations inapplicable to the present state of society," although he tempered the statement by saying that he "would not agree to remove an unbroken pillar of the common law which might serve in any degree to support the general system or to change the grounds upon which property has rested permanently for ages, merely because we cannot at this day discern the correctness of its principles." It is Mr. Justice Yeates's phrase about "the rubbish of antiquity" that is much more likely to be remembered than his expression of respect for the ancient foundations of modern systems. Such phrase-making merely illustrates the profound truth of the dictum of Abtalyon, who was vice-president of the Great Sanhedrin of Jerusalem, in the middle of the first century, before the Christian era. He said, "Wise men, be ye careful of your words lest ye be exiled to a place of bad water and the disciples that come after you drink of it and die."

Admitting the existence of a problem, we are confronted with several possible modes of attempting its solution, the safest of which is that of tentative effort based upon careful research and comparative study. The subject is not one that can be treated from political rostra. It needs the careful attention of studious investigation.

Long after practical politicians shall have dropped the subject for some other that appears to them of more popular and immediate interest, students will continue to work at it and eventually, as I believe, contribute results which, when translated by experiment into reality, will be found practicable and beneficial. Ancient law is being overhauled and re-examined for illustration and precept. Methods in vogue in foreign jurisdictions are being examined. A great body of material is being prepared for the constructive genius of the future. The science of the administration of justice has been born and we shall, within

the next decade or next generation, see it grow into an important adjunct of the science of sociology.

Shortly after its organization the American Judicature Society attempted to formulate the causes for dissatisfaction with the administration of justice in metropolitan districts. These causes were grouped under six heads:

(1) The selection, retirement and discipline of judges.

(2) The organization of the judges after they are selected.

(3) The selection of jurors as judges of the facts; the guidance of the jury and discrimination in its use.

(4) The rules of practice and procedure.

(5) Efficiency in the offices of clerks of courts.

(6) The selection, retirement, discipline and organization of the bar.

Prof. Roscoe Pound, a director of this society, was perhaps the first to summarize the difficulties of our problems of administration of justice in an address delivered by him, in 1906, before the American Bar Association, and his influence is again shown in a more recent summary in the preliminary report of a Committee on Efficiency in the Administration of Justice, prepared for the National Economic League. Attention is directed to the fact that the administration of justice according to law will always arouse a certain amount of dissatisfaction, because it is a compromise between requiring the judge to apply the rules of law strictly and allowing him a broad discretion in their application. In the first case you have hard rules of law which would, in some cases, work injustice; in the second case you have a system which would result in the adoption of so many exceptions to the rules of law that the stability of the law might be lost. To find the golden mean between these extremes is by no means easy. The fixed rules must remain and be applied, yet made moderately flexible so as to be used by the court to yield to the requirements of justice, or, as Lord Chancellor Haldane said, the application of rules "must correspond with the practical necessities of the times." Judges have always felt the pinch of this difficulty and have often expressed their feel-

ings. For instance, Judge Brackenridge, of the Supreme Court of Pennsylvania, once said that the court does not sit to take its rules from Siderfin and Keble, law reporters of the seventeenth century. "Nor do we sit here to be bound by every rule of a former period. . . . If we thought ourselves bound by every rule of the common law, it would furnish the best reason for abolishing it. The reason of the law, says Lord Coke, is the life of the law. And will not the reason cease with a change of situation and circumstances? In an enchanted island we might not find ourselves at liberty. But however judges might be bound by every rule of jurisprudence in the island of Great Britain, we have crossed the ocean and are at a distance of three thousand miles. Our situation is changed, and it is only such parts of the common law as have been introduced by usage that we are to regard. And not all that, for we have the right to change a usage, so far as respects our rules of practice. . . . . Though Holt and Hale and Coke (three great names in English law) may have been entrammelled by them, we ought not to be. It would be like taking the skin of a dead horse for a horse." This expression of judicial sensibility to the need of flexibility in the rules of procedure and practice is by no means isolated. Our judges have always felt the danger of injustice from rigidity in rules of law, but, unlike the laity, have always felt the danger and difficulty of modifying them.

Another intrinsic difficulty in the subject is the fact that the law, from its very nature, lags behind the times and, therefore, apparently interferes with the progress of society. But the involved character of the interests of great communities and the infinitely varied views and standards prevailing at any one time, make it impossible, especially in our own country, which has practically no universally accepted traditions, that any system of law could be devised which should give universal satisfaction. To the most progressive element in society whose ideas are far in advance of the reaches of contemporary legislation and judicial opinion, the law is a check. To the lowest stratum of society lagging behind contemporary standards the

law is a spur. To the great mass, the law is a normal condition to well being.

Another intrinsic difficulty is the popular conception that it is a simple matter to decide a lawsuit. Perhaps the fact that our citizens are accustomed to sit on juries has led to this fundamentally erroneous view. Juries have since time immemorial been flattered into the belief that they are the judges of the facts. They are lauded in the addresses of counsel and solemnly harangued in the charges of the courts as a useful and necessary organ in the administration of justice. Jurymen, therefore, naturally presume that they are well qualified for the performance of their duties, and as most men are jurymen at some time, the notion that any honest man can decide a lawsuit gains general acceptance. As a matter of fact, juries in civil cases are an utterly obsolete and useless appendage in our system. They are dominated by the court. They are prevented from hearing the whole of any case through the technical rules of pleading and of evidence. They are imposed upon through emotional appeal and their verdicts, if opposed to the court's view of the evidence or the weight of the evidence, will be set aside without much regard to the theory that the juries are judges of the facts. Add to these reasons the well-known fact that our jurymen do not represent the best informed and most intelligent element of our communities. In New York, for example, "although by law the juryman must be a man of fair character, integrity, sound judgment and be well informed, he must not be a public officer, legislator, judge, surrogate, sheriff, sheriff's clerk or deputy, teacher, clergyman, person connected with a lunatic asylum, state prison or almshouse, or a physician, surgeon, pharmacist, veterinarian, embalmer, attorney-at-law, person connected with a press association or daily newspaper, or employed on a canal or steam vessel, or railroad or by a telegraph company, or a member or honorably discharged former member of the National Guard, or of a fire company or a steam boiler engineer or a pilot or a member of the police department or a grand juror or a sheriff's juror." Now from those who are

not thus barred by law there must be subtracted all those whose personal and business matters are so important that they will suffer serious loss by serving on juries. Under this category bankers, great merchants, managers and, generally speaking, men of larger responsibility are excused from jury duty by indulgent courts. "The juries are, therefore, drawn from a residuum of persons of no great responsibility, of limited outlook and of mediocre mentality, with nothing to commend them to the performance of so important a duty except presumably a desire to do right." But zeal without knowledge is fruitless, and our jury system is probably one of the most important contributing forces to the inefficiency of our courts of justice. The popular notion that any well-meaning person can decide questions between contending litigants, is on the same plane with that which substitutes bedside prayers for the advice of physician and surgeon and the emotional excitation of the public by violent preaching in the name of religion for sane consideration of social ills and their remedy. The existence of this notion must be taken into account in considering the difficulties of our subject.

I shall follow the report of the committee of the National Economic League in considering the matter of the inadequacy of our local and judicial system in the finding and interpreting of the law, which means largely making the law, and in the application of the law to controversies brought before the court by individual litigants.

Perhaps I should premise with a word to the effect that although the courts are presumed merely to interpret the law, they are in fact making the law. Judicial legislation is an absolutely inevitable process. Every decision of the appellate courts is a precedent which lower courts are obliged to follow, and the opinion of the court, instead of being merely an interpretation, becomes a declaration of the law. Attempts to limit the courts to the performance of a purely interpretative function must forever fail of their purpose, and all outcry against "judge-made" law is merely waste of breath.

One of the great causes of dissatisfaction with judicial law-making lies in the fact that the new problems of industrial and urban communities must be solved under our existing legal system according to principles and in obedience to forms of procedure which were fashioned to meet the demands of simple communities in the early part of the nineteenth century. For instance, the problems arising out of modern factory life are decided according to principles which were formulated in the days when the workman was an apprentice in the master's shop, when there was a direct domestic relation between them and when the master was a human being like the servant. Today the servant has given place to the employee, a mere negligible unit in a large industrial establishment with no direct relation between him and his employer, the latter as a rule being a mere legal entity—a corporation.

The enormous development of commerce and industry and the rapid growth of our population have added another cause of dissatisfaction. The business of the courts has increased correspondingly, and this has affected the thoroughness with which lawyers prepare and argue their cases and the deliberation and care with which the courts decide them. Lack of assistance from the bar and the necessity for haste by the bench must produce results unsatisfactory to the community.

In addition to these general causes of dissatisfaction there are local causes operating generally, but unequally, in all of our jurisdictions. These are, first, the tenure, mode of choice and personnel of the bench; second, the education and organization of the bars, and third, a bad state of legislative technique.

First, therefore, whom shall we select as our judges? How shall we select them and for what length of time shall they serve? The latest method is the non-partisan ballot for the election of judges. It succeeded the method of so-called popular election, which was, in fact, only a cloak under which judges were appointed by political leaders. In some states the elective system has never been adopted, and the old practice of appointment by the governor or by the legislature, or both, has been

retained. In England the judges are ostensibly appointed by the Crown, but practically by the Lord High Chancellor from among the leaders of the bar. In Ontario they are appointed by the chief law officer of the state by and with the advice and consent of the cabinet. It has been proposed that the judges of our lower courts shall be appointed by the judges of the supreme court, and that the latter shall be elected by the people from among the judges of the lower courts. It has also been proposed that the chief justice of the state shall be elected for a short term and have the power of appointment of the judges during his term of office. It seems to be the general rule, under our present system, to exercise higher care in the selection of supreme court judges than in the selection of the judges of the lower courts, and to exercise no care at all in the selection of the justices of the peace and of the magistrates with whom the great mass of the people are most frequently brought into contact. In more aristocratic governments the justices of the peace are selected from among the property-holding class. It would seem highly desirable that the members of the minor judiciary should be men as well qualified intellectually and morally as those who sit in our supreme court. In pedagogics we are laying more and more stress upon the qualifications of the teacher in the elementary schools. In the law this principle is, barring certain exceptional illustrations to the contrary, as yet merely a theory. I find in reading the account of the system of judges recommended by Jethro to Moses this essential truth, that the higher as well as the lower judges were selected from the same class and with the same qualifications, namely, that they should be selected "out of all the people, able men such as fear God, men of truth, hating covetousness." And it is to be noted that the first qualification is that they should be able men. In some European systems the judge of the supreme court exists potentially in the judge of the humblest court, for the appointment to the high magistracy is made from among those in the lower courts.

It is generally held that the elective system of judges has

failed; that the quality of the bench under this system is distinctly inferior to that under the appointive system, and that a return to the latter is desirable. The appointed judge, holding office for life or during good behavior, took a large and liberal view of the law and exercised a sound constructive influence. The elected judge, with a short term of office, timidly followed the precedents and developed much of the technicality of our procedure and a narrow adherence to ancient legal ideas, and as he had to be thinking of his re-election he was not quite free from the pressure of political necessity and the control of the dominant political party or power. Even under the best system an individual judge may fall short of the ideal. Under our present system this happens too frequently, for although American judges, as a class, are a conscientious and competent body of men, yet there are too frequent individual cases of ignorance of the law, bad manners and abuse of the right of patronage.

The second of the local causes of dissatisfaction is the education and organization of the bar. In many of our jurisdictions the practice of the law is open to anyone as a method of earning a livelihood, and it is only in recent years that serious requirements for admission to the bar exist, outside of a few states. It was always possible to point to the example of exceptional persons like Abraham Lincoln who obtained extraordinary eminence, notwithstanding the lack of much preliminary training, and the result has been the crowding of the American bar with a large number of ill-trained lawyers, devoted solely to getting a living out of their profession and with no sense of public duty or responsibility in its practice. Great efforts are now being made through the American and local bar associations, aided by the great law schools, to insist upon more and more rigid requirements of general and professional education as prerequisites to the right of admission to the bar. The Carnegie Foundation for the advancement of teaching has, since 1913, been studying this great question, the final report on which will probably not be presented for several years. The

Law School of the University of Pennsylvania has, with the approval of the trustees, adopted as the requirement for admission hereafter that all applicants must present a degree of Bachelor of Arts or an equivalent degree from an approved university or college. A well-educated lawyer will more easily be taught to see the larger relations and aspects of his professional work, its social aspect, its general bearings on the welfare of society as well as its effect on the individual litigant. The lawyer who really knows the law and has approached its study upon a broad foundation of general culture will not readily degenerate into the ranting bully or the sly manipulator whose performances so often disgrace our court proceedings. There can be no sadder spectacle than the cheap lawyer playing his pitiable part before a judge who suffers from professional mediocrity or from the cowardice that is often bred through fear of displeasing those who may determine the length of his tenure of office. Here we have an extreme illustration of conditions making for inefficiency on the bench and at the bar. Notwithstanding the desirability of high professional training, we are obliged even in the older jurisdictions to be on our guard to prevent degeneration of our ideals. There is at present an Act of Assembly before the Legislature of Pennsylvania which purposes to abolish the State Board of Examiners appointed by the Supreme Court and all preliminary educational tests of fitness. It would re-establish the old county boards of examiners and permit any one to register as a law student who can find a law office to which he may attach himself. Improvement lies in the very opposite direction. We need fewer lawyers of better quality, of broader education and outlook and of greater thoroughness. A bar composed of such men could wield a great and salutary influence on our public life. This influence is lacking, for we are just in transition from the pioneer period in which our local bar associations lack proper basis of organization and true *esprit de corps*. If the bar associations were incorporated with the right to control the admission of their members and with the requirement of admission to the bar association

as a prerequisite to practicing at the bar, they might exercise a beneficial influence in improving the quality of the bar as well as of the bench, and thus contribute toward the solution of the problem under consideration. At present the influence of the bar in this direction may be said to be practically zero.

The third of the local causes is the bad legislative technique. An immense amount of legislation is mere waste effort because it is declared unconstitutional by the decisions of the courts. Furthermore, much of this legislation results in contradictory enactments and vain repetition, and requires the expenditure of much judicial time in attempting to harmonize differences that are due to inapt and uninformed expressions of legislative intent. There is some justification for the view that our laws are made primarily for the purpose of being amended and repealed; secondarily, for the purpose of being administered, and thirdly, for the purpose of being obeyed, and the contribution of our legislators to the welfare of society consists in making two contradictory rules of law come into existence when none existed before. Collections have frequently been made of so-called freak bills that are presented and sometimes enacted by legislatures. An illustration that has recently come to my notice may not be uninteresting. In New Zealand, as a result of the importation of Chinese cheap labor, laundresses were thrown out of employment. Under the law in New Zealand a laundry is a factory, and for the purpose of remedying the evil caused by this undesirable competition, it was proposed to amend the factory law of New Zealand, which contains a clause prohibiting the employment in factories of girls under the age of eighteen by adding the following: "That for the purposes of this act a Chinaman shall be deemed to be a girl under the age of eighteen years." Although our legislators have many members of the bar among their number, this fact seems to have contributed but little to the quality or the form of the legislation. If our legislators had permanent professional counselors whose duty it would be to advise in such matters, there might be great improvement in the form of our statutory law. A very

modern device is the Legislative Reference Bureau which seeks to assist the legislators in giving information in matters of substantive law as well as assisting the legislature or individual members thereof in drafting acts. Such a bureau was established in Pennsylvania in 1909, and there is every reason to believe that as a result of its assistance our legislation in Pennsylvania will show a marked improvement in substance as well as in form.

Turning our attention to the causes for inefficiency in the disposition of the cases brought before the courts for litigation, we may consider the subject under four heads:

1. The defective organization of our courts.
2. The want of proper organization of the administrative and clerical sides of our tribunals.
3. The growth of volume of reported law.
4. The procedure.

We have too many courts with separate jurisdictions and powers. Instead of having specialist judges, we have specialist courts, and our judicial power is wasted by the multiplicity of tribunals, by a system of rapid rotation in which no one judge acquires the necessary specialized skill in any one class of judicial business, and in the treatment of controversies piecemeal, part in one court and part in another, instead of having them all disposed of by one tribunal. The remedy proposed for this evil is the unification of the courts in the entire jurisdiction. We have frequently heard of late suggestions for the reorganization of the courts of Pennsylvania. It has been proposed that there shall be a single court for the entire state to include the appellate courts, the trial courts of law, the orphans' courts and the criminal courts; that judges shall be assigned to the various branches in accordance with their special fitness and qualification, and with the right to sit in any other branch if the exigencies of the business require it. As a matter of fact, such a system has been in existence for more than a generation in England and in Ontario. The system avoids conflict of jurisdiction and saves judicial time. The matter is thus summed up

in the report of the committee above named: "Some one high official of the court should be charged with the supervision of the judicial business of the whole court, and he should be responsible for failure to utilize the judicial power of the Commonwealth effectively. He should have the power to superintend the calendars of the different branches and divisions, and to make such classifications and distributions of the business in each branch or division as experience shows to be suited to advance its work. He should have power to make reassignments of judges or temporary assignments to particular branches or divisions or localities as the state of judicial business, vacancies in office, illness of judges or casualties may require. He should have the power, according to general rules, framed by the court and improved as experience dictates, to transfer or specially assign causes or proceedings for hearing or disposition according to the condition of the calendars. He should be responsible to the people for insuring that the whole judicial power of the commonwealth is fully and effectively employed upon all the business of the court. Moreover, under the general superintendency of this head of the court there should be a like judicial officer, since no clerk should be given such powers, for each branch and division, and where there are large cities for each locality. This officer should have similar powers with respect to the branch, division or locality of which he is the chief or presiding judge, and should be responsible to the chief of the whole court for the classification and distribution of the business and effective disposition of the causes assigned to it. Concentration of responsibility in this way should be a sufficient safeguard against abuse of these offices."

The proper organization of the administrative and clerical side of the courts could be accomplished by rules prepared by the court and amended as experience dictates. In many jurisdictions the clerks of the courts are elected officers and are practically beyond the control of the court whose clerk they are supposed to be. The office is a political one and is usually given for political service. That a measurable degree of efficiency

exists in spite of this drawback is no excuse for the further continuation of what is inherently and practically indefensible. The Municipal Court of Chicago has shown what can be done in the development of efficiency through proper organization. It is a court organized under the strong central control of the chief justice. By a simple order of court a change was made in the method of keeping records in the clerk's office which is said to save the municipality the sum of $200,000 a year. No public clerk's office where the appointment or election is purely political has ever been known to effect any such saving. The Honorable Harry Olson, the chief justice of the Chicago Municipal Court, is an outstanding figure in the American judiciary. He seized the great opportunity that was placed within his reach, and by devoting himself constantly to the study of the organization of his court he has made it unquestionably the most remarkable tribunal in the United States. If time allowed I should have liked to present at length an outline of the organization, jurisdiction and practice of this court. It is a subject that commands the attention of all those who are interested in the great problem of reform in our system of administering justice. Suffice it to say in this connection that the Chicago Municipal Court is a ministry of justice, a sociological laboratory, a bureau of statistics as well as a court, and it is a better court in that it combines the non-judicial and extra-judicial functions with those normally associated with the idea of a court of justice.

The growth of the volume of reported law is another problem that demands attention. Professor Samuel Williston tells us that at present there are something over 8,600 American law reports, whereas in 1885 to 1886 there were a little over 3,500, showing a growth of 5,000 volumes, or a 150 per cent in less than thirty years. The result is that the ownership and maintenance of a properly equipped law library is a matter of great expense. It will have the further result of restricting the practitioners in each state to the consultation of their own state reports, for in addition to the practical impossibility of either

owning or consulting the reports of all the states, there is the fact that in the older states there is hardly any question for which precedent cannot be found without the necessity of consulting the reports of other states. Thus, as the nation grows older the necessity for consulting the decision of courts in other jurisdictions grows less. This, on the other hand, "intensifies the evil of diversity of law," and may result in considerable differences in legal doctrine in the several states of the Union. In every aspect of the question it presents a problem practically almost impossible of solution. It has been suggested that most of the reports should be burned. Even were this possible it is still doubtful whether it would be desirable. But the printing press has made it possible, for as long as a single stray volume escapes the pyre it may rise up some day to confound the court. A somewhat more practical solution is suggested by Professor Williston in a partial codification, whereby the law on certain subjects could be harmonized and unified, and much of the antecedent case law be made obsolete. In the report of the American Bar Association it is suggested that only those cases should be published which are of real value in the statement and development of the law, and that the opinions should be reported as briefly as is consistent with a clear statement of the facts and of the legal principles applied to then. By discrimination and exclusion the evil of over-multiplication of reports might be restricted. Perhaps the time may come when it will be recognized that just as the ablest lawyer is he who can make the shortest speech and draft the most concise paper, so the ablest judge will be he who can decide a case correctly in the briefest opinion.

The problem of procedure has attracted more attention than any other. Too much emphasis has been laid upon it, and the feeling has spread that if only our procedure is right, all of our troubles in the administration of justice will be over. As a matter of fact, the character and quality of the judges, their method of appointment and their tenure of office, the reorganization of the system of the courts and the reorganization and

improvement in the quality of the bar are matters of much greater importance than mere reform of procedure. With able judges and lawyers of high type almost any system of procedure will work well. With poor judges and lawyers of low type the best system of procedure will work badly. Our procedure, like our courts, arose from sources differing in their origin, in time, in place and in circumstances. Our procedure is hardly a system, but rather an amalgam. It is excellent in parts and bad in parts. It has never been worked over and developed according to scientific theory. The faults of our procedure are most obvious. The faults are obvious to the bench and the bar. Mr. Justice Mestrezat, of the Supreme Court of Pennsylvania, recently said: "Our judicial procedure should be revised and simplified so as to assure an expeditious adjudication of every litigated cause. Delays for technical reasons should not be tolerated. While essential legal formalities should and must be observed in disposing of all litigation, yet we are far away from the time when technical objections not affecting the merits can be permitted to delay or defeat a just cause."

There are many reasons for the lack of efficiency in procedure, but I, in common with many others, believe the fault lies principally in the fact that the procedure of our courts is largely prescribed by the legislature. One might suppose that it would long since have been recognized that, as the purpose of practice and pleading is to enable the courts to get at the merits of the controversy as quickly as possible, the courts should be in complete control of the rules relating to practice and pleading. But instead we find that in nearly all of our states the rules of practice and pleading are largely prescribed by legislative enactment. In New York the system has resulted in a most outrageous condition of inefficiency and wastefulness. New York has probably the worst system in the United States, due to the fact that its code of civil procedure compels the courts to obey the mandate of the legislature in every insignificant point of practice. Cases go up to the Appellate Court upon every point, and there may be and often are half a dozen appeals in a single

case before the matter is finally adjudicated. In other states the effect is not as bad as in New York, but all of the states suffer more or less from this evil. There was a time when the people thought it was necessary to restrict the courts by legislative enactment in order that their powers might not be too great. The time has come to throw off this legislative yoke and give back to the courts their original powers to make and amend their own rules of procedure. The New York and similar systems of procedure train the logical powers, sharpen the mental vision and the power of drawing delicate distinctions; but it is much to be doubted whether they promote justice, for the practice becomes an end in itself instead of developing the point of substantive law and the issue of fact that is the real source of the controversy. It is, to quote again the words of Mr. Justice Brackenridge, "taking the skin of a dead horse for a horse."

We must find a better method than that of New York, and we shall, I think, find most light by looking to England and Ontario for example. The courts there make all the rules and change them from time to time at meetings of the judges. A brilliant and scholarly contribution to our knowledge of this subject has just been published in the University of Pennsylvania *Law Review* by one of our Gowen Fellows, Samuel Rosenbaum, Esq., in a series of articles entitled, "Studies in English Civil Procedure: The Rule-making Authority." A remedy for some of our trouble is to be found in repealing all legislative rules of pleading and procedure, and conferring upon the courts, either the Supreme Court of the state or a judicial committee consisting of judges of the supreme and lower courts, the power to make, amend and modify all rules relating to practice and procedure so as to bring the very gist of the matter before the court, that it may determine the real matter in dispute and give judgment according to the very right and justice of the case. There is no need for technicality in the matter of procedure. We have the example of our Orphans' Court and bankruptcy courts that are governed practically without any rules of procedure, in which the system is so flexible that the

tribunal is concerned only with the substantive merits and questions of practice are rarely made the subject of controversy. There is no reason why this system could not be introduced with equally good effect into our courts of common law.

The practice with relation to the jury is likewise the cause of much inefficiency. The entire subject of trial evidence is a stumbling block, existing only because we have the jury in civil cases. If there were no jury, as in proceedings in equity, in bankruptcy and in the Orphans' Court, questions of admission or rejection of testimony would be comparatively unimportant. At present they are the cause of many mistrials and waste of time and money.

The subject of expert evidence is one that has attracted a great deal of attention likewise because we have the jury system. In so far as the jury could be made unnecessary in civil trials, the disadvantage of the present system of expert testimony could be obviated.

The procedure on appeal tends to become too technical under our present system of courts where the appellate court is purely an appellate court and stands in no other relation to the court of common pleas whose judgments it reviews. In the court of common pleas after a case has been tried by a judge and jury, it may be heard on motions for new trial, etc., before the court in banc; that is to say, before the trial judge, assisted by one or two other judges of his court. Such a tribunal is virtually an appellate court for the purpose of reviewing the trial and determining whether there shall be a new trial. The procedure is simplicity itself. A motion is made by the unsuccessful party and this motion brings the record before the court for review. When, however, an attempt is made to take an appeal to another, that is to say, a supreme court, the procedure is quite different. An appeal has to be taken, a record has to be made up and printed and a number of rules, in some jurisdictions very minute and cumbersome, must be followed in order to bring the matter properly before the court on appeal. All this is sheer waste, and again we can look to the example of the

English and Ontario courts. In Ontario the practice in appeal is as simple as in Philadelphia the practice before the court in banc, and the disposition of cases on appeal on mere ground of non-conformity with appellate procedure is substantially impossible.

Metropolitan cities create special and difficult problems. They are composed of heterogeneous elements, new to our soil, ignorant of our customs and methods, and, unfortunately, taught to be suspicious of us and our magistrates because of the ill-treatment that they so frequently receive at our hands. They are foreigners and, therefore, not considered of much account, and the short-sighted stupidity that treats them in this way fails to realize that they have come to stay, and that the treatment they now receive will be reflected in their actions, in their views and in their children. Our local magistrates with whom the foreigner first comes into contact are utterly unfit to deal with them and their problems. The local magistrate is a survival of the country justice of the peace—known to all his neighbors, knowing all of them, living in a settled community with established traditions. A magistrate in the large city exercises the functions of the justice of the peace in a community that is utterly strange to him in language, in religion, in views of life, and to whom he is equally strange and inscrutable. As a result of the association of the magistrate with the politician, corruption of all sorts flourishes and the impression that the foreigner in our large community obtains is that justice is a matter of bargain and sale. At best, when the magistrate is not moved by other reasons, he may take the view that was once expressed by a member of this class, "I am always in favor of the plaintiffs, because if there ain't no plaintiffs there won't be no business for this court." An attempt has been made in some cities, through the establishment of municipal courts, to improve this condition. They are a distinct improvement on the older system, but they await the final reforming touch by which they shall be made part of the single court for the state, and whereby the petty litigant shall be able to have judicial investigation and

disposition of his cause equal to that which the rich and powerful litigant may obtain by taking his case eventually to the supreme court of the state. The establishment of municipal courts has paved the way toward future reforms.

I have thus cursorily touched upon the principal problems in the administration of the law with which the lawyer and sociologist are now concerned. What has been said indicates in a general way the lines along which remedial efforts may be directed. In conclusion, I again have recourse to the report of the Committee of the National Economic League.

The remedies suggested by this committee are the result of a careful study based upon material representing enlightened opinion gathered during the past eight years. The committee in preparing its report used a collection of newspaper clippings from all parts of the country, commencing in 1907 and continuing to the present, a card catalogue of decisions from every part of the country in which questions of practice or procedure were involved, and which seemed to indicate defects or possibilities of improvement; a collection of books and articles, both legal and lay, dealing with every phase of judicial administration. The committee sums up the main topics under which remedial measures might be grouped and studied as follows:

1. The proper training of the legal profession.
2. Giving the bar greater influence in the selection of judges.
3. Unification of the judicial system and more effective and responsible control of judicial and administrative business.
4. Giving rule-making power to the courts.
5. Improvement in substance and technique of legislation.
6. Thorough study of the new problems which an industrial urban community has raised and of the means of meeting them with the jural materials at hand.

THE MUTATION THEORY OF ORGANIC EVOLUTION

By Bradley Moore Davis

Professor of Botany, University of Pennsylvania

At the beginning of this century there was published a work, "Die Mutationstheorie" (1901–03), by Professor Hugo De Vries of Amsterdam, and at this time also was rediscovered a long-buried paper of the Austrian monk, Gregor Mendel, "Versuche über Pflanzen-Hybriden" (1865). These two contributions having profoundly influenced the philosophical thought in botany and zoölogy, and opened with renewed vigor the discussion of certain principles of organic evolution which, to many, may have seemed quite settled by the writings of Darwin.

The work of Mendel and De Vries was notable for the application of experimental methods to the study of the characters of species as they are passed from parents to their offspring. Mendel, by cross breeding varieties of peas, sought to establish an orderly plan of inheritance that could be expressed in mathematical formulæ. De Vries, after many years of investigation in his botanical garden, reached the conclusion that species at times suddenly give rise to new forms fully developed, and that the origin of species is usually by sudden and large steps rather than through the accumulation of small variations as was believed by Darwin.

It is not that either the mutation theory of De Vries or the principles of Mendelism attack the foundations of Darwinism, for both deal with features of organic evolution quite apart from the theory of natural selection. Darwin's principle of natural selection, operating as a result of the struggle for existence, remains quite untouched by the heat of the present-day controversies—a factor of organic evolution which is now believed to be fully as important as when the friends of Darwin

fought his battles in the latter half of the past century. Natural selection from among the multitude of species and varieties determines which shall remain upon the earth to leave descendants. Natural selection thus guides the course of organic evolution in all of its diversified forms.

Natural selection, however, does not create the material with which it works. It does not make the animals and plants of which some are to survive as the fittest, but most are to perish. The species of animals and plants are self-creative, reproducing not only the like from the like, but also in large measure giving rise to the unlike. It is this phase of the subject of organic evolution, the origin of the unlike, that chiefly holds the stage of present-day biological discussion. Expressed in different words, the problems of the origin of variations and their behavior in inheritance are receiving at present the greatest degree of attention on the part of investigators in the fields of genetics.

The problem of variation is not new. There was such a problem in Darwin's time and earlier, and Darwin was fully aware of its fundamental relation to organic evolution. It was, however, only necessary for Darwin to prove the presence of variation as a phenomenon widespread in nature which furnishes the material for the operation of natural selection. And Darwin established the fact of variation by a most remarkable mass of data gathered from observations on plants and animals in the wild and under domestication. Beyond the facts of variation Darwin hardly ventured, and indeed the time could not come for the fuller discussion of its causes until the subjects of embryology and cell studies had reached a high degree of development and had opened a way for the interpretation of experimental work on the origin of new characters and the modification of the old.

To Darwin variation included phenomena universally present in nature which, while differing in degrees and in the forms of their manifestations, were, nevertheless, not fundamentally unlike. The chief advance in the more intensive study of varia-

tion since Darwin's time has been the recognition of forms of variation, which take no part in the heritage of the species.

Numerous and marked variations in the bodily structure of animals and plants are now known which make no impression upon the germ plasm from which the reproductive cells arise. Such, for example, are the modifications of an organ which come from use or disuse, or the influence of an environment which as light, heat or moisture may profoundly affect the color or form of organs or the texture of their tissues. The variations induced by external factors and affecting only the body plasm, as distinguished from the germ plasm, are known as somatic or body variations because they do not leave a specific impress on the reproductive cells and, consequently, are not inherited. They are also called fluctuating variations, since there is no stability in the degrees of their manifestations.

In the class of somatic variations belong the so-called acquired characters, the inheritance of which was generally assumed in the days of Darwin. These are characters taken on by the body independently of the normal processes of development which bring out in the individual the heritage from past generations. An unusual development of muscles through use is an acquired character, as is also the reduction of the size of leaves on plants grown under abnormal conditions of heat and drought. We owe to Weismann the most powerful attack on the hypothesis of the inheritance of acquired characters which, in its extreme form, is now scarcely debatable, so strongly against this doctrine is the evidence from experimental studies.

The variations which chiefly concern the student of genetics are those that modify the heritage that is passed on from one generation to the next. These variations are termed germinal to distinguish them from the somatic or body variations. Germinal variations are due to direct modifications of the germ plasm in the reproductive cells or of the germ plasm from which these cells are derived.

Again, biology is indebted to Weismann, since he it was who first formulated and elaborated the conception of a germ plasm

in relation to the processes by which the reproductive cells are formed and in relation to the history of development from the fertilized egg. The germ plasm is that generalized protoplasm which has the power of reproducing the species. It generally starts each generation by the fertilized egg, and, continuing throughout the development of the individual, is passed on to the reproductive cells which are formed at maturity. The passing to the offspring of material similar to that derived from the previous generation is termed the continuity of germ plasm. Weismann's theory of the continuity of the germ plasm rests upon a body of embryological and other cell studies which were not known at the time when the "Origin of Species" was published.

During the history of the development of a higher animal or plant numerous tissues are differentiated and specialized in various directions, and these tissues lose the power of reproducing the species. These specialized tissues and the organs which they compose constitute the soma or body as distinguished from the germ plasm. The soma as specialized tissues serves the individual in various ways, and above all protects and nourishes the germ plasm which, in the highest animals, is present only in the reproductive organs.

Thus, with respect to their place and function in the organism, the living substances of a higher plant or animal may be separated into germ plasm which has the power of propagating its kind, and somatoplasm which concerns itself with the development of the body. The somatoplasm is the more highly specialized, and with its specialization goes a loss of reproductive potentialities. The germ plasm is the more generalized, carrying the power of reproducing itself and of furnishing the starting points for the development of new individuals. A long succession of cell divisions, beginning with the first division of the egg, carries the germ plasm during the development of the organism to the place where, at maturity, another generation of reproductive cells is produced. This chain of cell divisions should be carefully distinguished from the differentiation of the numer-

ous tissues that make up the body plasm and which generally lose, with their specialization, the power of reproducing the individual. Thus, the germ plasm may be conceived as a stream moving through each individual during its development on to the reproductive cells which at maturity are capable of producing the next generation. The chain of cell divisions that carries the germ plasm through the life history of an organism has been called the germinal path.

We have noted that variations fall into two groups: (1) somatic or fluctuating variations which do not affect the germ plasm and, consequently, are not inherited, and (2) germinal variations which are modifications of the germ plasm itself. The phenomena of inheritance are then the expressions of germ plasm from one generation to the next, and organic evolution is the result, from time to time, of changes in the germ plasm. All theories of organic evolution admit that in the germ plasm lies the physical basis of heredity, and all theories recognize that modifications of the germ plasm are responsible for the evolution of structure and the origin of new species.

It will probably be admitted by all biologists that most of the germinal variations in higher organisms result from the mixing of germ plasm through sexual reproduction. The effects of the union of diverse lines of germ plasm, as when different kinds of animals or plants are crossed, is immediate and striking. Hybridization is the method most generally employed by breeders in the creation of new forms, and in nature hybridization has been a potent factor for organic evolution. Many investigators claim hybridization as the most potent factor. The effects of hybridization are immediate in the first generation, but much more pronounced in the great variety of forms produced by the second generation. This latter fact is a principle of fundamental importance to the Mendelian theory of inheritance which, however, we cannot consider at this time. As a general rule, germ plasm is more profoundly modified by hybridization when the forms crossed are most distantly related.

For the modifications of germ plasm which result from hybridization we can see an obvious physical basis in the mingling and interaction of germ plasm of different organization. Modifications of characters are to be expected under such conditions, and, furthermore, it is not surprising that these modifications should frequently occur abruptly and not grade imperceptibly into the characters of the parents. These changes constitute discontinuous variations through which something distinctly new is evolved, and may be compared to the results of chemical activities which give products readily distinguished from the substances that entered into the reactions.

This brings us to an important point in our discussion, for we must now distinguish between continuous and discontinuous variations. Continuous variations are those which grade by steps so small that the passing from one grade to another introduces no features distinctly new in character. Good illustrations of continuous variations are found in the fluctuations in the size of organs which are easily affected by environmental factors or by use or disuse. For example, the size of animals and plants will be modified by favorable or unfavorable conditions of growth and development. The employment of an organ increases its efficiency, while failure to use it will lead to degeneration. Thus, the extent of a root system bears a direct relation to the demands made upon it by the portions of the plant above ground; aquatic plants will be found to have their root systems either greatly reduced in structure and extent or even wholly absent. Discontinuous variations are those in which the changes are qualitative in their character, introducing new features without transitional stages. Germinal variations are generally clearly discontinuous in their nature, as illustrated in changes of color or of color pattern, or in the loss of a character from a complex. Hybrids supply abundant examples of discontinuous variations, since their characters are frequently sharply distinguished in some qualitative manner from those of their immediate ancestors.

Darwin knew of the existence of discontinuous variations

as illustrated especially by the extreme and sometimes freak forms of animals and plants called "sports." Sports owe their peculiarities, as a rule, to some marked variation of the germ plasm, and, in consequence, their characters may be inherited. Darwin did not, however, know that continuous variations are chiefly somatic variations and not inherited, and he did not distinguish between these somatic or fluctuating variations and the discontinuous variations of a germinal nature. A serious difficulty in the critical study of variation lies in the fact that an examination alone is frequently not sufficient to determine whether or not the departure is somatic or germinal in its character. There are numerous discontinuous variations in which the change is of a degree so small as to resemble in appearance the grades of fluctuating variations. The only sure test of the character of a variation lies in experimental breeding, for somatic variations (usually continuous) are not inherited, while the discontinuous germinal variations are represented in the stream of germ plasm which flows on through the offspring and, consequently, will appear in future generations as part of their heritage.

Studies on germinal variations, discontinuous in character, have led to the recognition of an immense number of illustrations in various groups of animals and plants. Especially are we indebted to the English geneticist, Bateson, who, in a large volume, "Materials for the Study of Variation," has gathered data showing that discontinuous variation is widespread to a degree formerly not appreciated. Attempts to classify the forms of discontinuous variations have brought out certain striking features that should briefly be noted.

By far the most conspicuous forms of discontinuous variations are those in which a well-marked character of a species fails to develop in certain individuals. Its loss comes suddenly without preliminary warning, since from parents having the character in full development arise offspring without a trace of its former presence. Such variations are termed *retrogressive*, because the organism loses a character which is the property of the race

from which it was derived. Retrogressive variations have been proved by numerous experimental studies to be germinal in their nature. Striking illustrations are found in series of color changes leading to albinism, which is the last step in the elimination of color. Many races of animals produce from time to time albinos, and many species of plants with colored flowers give rise occasionally to white varieties.

Sometimes the form or size of an organ may vary by a degree so large as to fall outside of the range of fluctuating variations which are so common in these characters. Thus, there may be a dwarfing of some organ or of all of the organs composing an individual. Dwarfed forms are regarded as retrogressive and are not uncommon. Much rarer are examples of gigantism wherein the size of an organ or of an individual is much increased. Where gigantism, as in certain cases, has been shown to result from an increase in cell size and nuclear content, the modification would appear to be *progressive* in character. In general, however, clear cases of progressive variation, discontinuous in character, are hard to find except where they are the result of hybridization and, therefore, represent some modification caused by the union of diverse germ plasms. Thus, the most pronounced advances in animal and plant breeding have been made through the practice of crossing favorable forms and selecting improved types from among the varied progeny.

Finally, mention should be made of a type of variation whereby a character of a remote ancestor suddenly appears in an individual. Such variation, termed *degressive* by De Vries, illustrates the phenomenon of reversion. Certain cases of reversion have been satisfactorily explained by the Mendelian theory on the evidence that reversion results when two or more factors responsible for a character are brought together by some chance union of sex cells, neither of which had the complete set of the necessary factors, but which together were able to complete a set. One of the most interesting cases of reversion studied experimentally is the behavior, when crossed, of certain races of white sweet peas. These albino races close-bred are

perfectly true to their white color, but when crossed the result is a generation of plants all of which have the full coloration purple and red of a wild pea that was the ancestor of these cultivated forms. In this case it is clear that the two races of white-flowered peas lacked each the complete set of factors necessary for full coloration, but one race was able to supply what was lacking in the other and the two when crossed produced a complete return to the ancestral type.

We are now prepared to consider the theory of evolution which is the subject of this paper—the mutation theory formulated by Professor De Vries, the result of more than a quarter century of experimental studies. Briefly stated, the mutation theory assumes that species at times pass into a state when they lose the stability expressed by the phrase that species breed true. Important changes at these times take place in the organization of their germ plasm, which becomes so modified that the species is able to give rise to progeny some of which are strikingly unlike their parents. A species that is thus able to produce types unlike itself is said to "mutate," the new forms so produced are called "mutants," and the new structures are "mutations."

De Vries was so impressed by the amount of discontinuous variation in plants both wild and under cultivation that he was led to undertake experimental studies in the hope of finding species which were in a state of active mutation. The conditions of the experiments of course required that the species be pure, that is, as free as possible from the taint of hybridism, since mutations, as De Vries uses the term, are germinal variations independent of such modifications as are introduced by cross breeding. He searched for a long time among the wild plants available to him without finding forms that did not breed true or reasonably true when grown in the experimental garden. Finally, however, in 1886, some observations on evening primroses, *Oenothera*, growing wild in waste ground in the vicinity of Amsterdam, led De Vries to believe that in this group of plants was to be found the desired material—a plant

in a state of active mutation. The plant was a species known to gardeners as *Oenothera Lamarckiana*, a beautiful large-flowered evening primrose frequently grown as a garden plant. It had escaped from cultivation into the waste ground and had there developed a population of some thousands of individuals, certain of which were markedly different from the parent stock. The variations suggested mutations and De Vries at once devoted himself to their study, and thus started a line of research which still occupies his attention and has drawn a considerable group of investigators into the same field.

In the study of the behavior of *Oenothera Lamarckiana* De Vries was not content with observations on what had seemingly occurred in the area under examination where several forms were present so distinct from *Lamarckiana* that they could be recognized at a glance. He proceeded to transfer young plants of *Lamarckiana* to his experimental garden and to grow seed from wild plants in controlled cultures. This marked the beginning of extensive experimentation and many years of observation on the behavior of *Lamarckiana* when grown under conditions that eliminate the possibility of cross breeding with other Oenotheras. De Vries has recorded in one case through as many as seven generations the progeny of *Lamarckiana*, growing in some years as many as 10,000 to 15,000 young plants from among which the departure from the parent type could be recognized. In the course of these studies he obtained a number of forms with characters such that they would be ranked as species distinct from *Lamarckiana* itself and from one another. Seven of these forms merit a few words of description.

(1) *Oenothera gigas* has appeared but once in all of the cultures of *Lamarckiana* grown by De Vries and other investigators, and is therefore a very rare "mutant." It is a plant much more robust than *Lamarckiana*, with thicker leaves of broader proportions, but because of the short internodes, its height is not so great as that of the parent. The flowers are larger and the

buds are stouter, but the seed capsules, although remarkably thick, are not so long as those of *Lamarckiana* and ripen fewer seeds. A most interesting peculiarity of *gigas* is the fact that the nuclei of its cells contain twice as many chromosomes as are found in *Lamarckiana* and therefore about double the amount of the substance chromatin which is believed to be the most important constituent of the nucleus. It seems probable that this fact is responsible for the greater size of the cells in its tissues. *Oenothera gigas* in the main reproduces itself fairly true.

(2) *Oenothera rubrinervis* has in the veins of its leaves and on its sepals and fruits a very much greater development of the red pigment anthocyan than is present in *Lamarckiana*. The buds and seed capsules appear very red, a striking feature, but not its only marked peculiarity. Although the general habit of the plant is similar to that of *Lamarckiana*, the leaves are narrower and the stem is much more brittle because of the weak development of supporting tissue. *Rubrinervis* is not a common "mutant" forming only about 0.1 per cent of the population in the cultures of De Vries. It breeds reasonably true and produces a good yield of seed.

(3) *Oenothera oblonga* is a smaller plant than *Lamarckiana*. Its leaves are more oblong in form, the buds and flowers are not so large, and the capsules are shorter and contain fewer seeds. De Vries reports that *oblonga* makes up about 1 per cent of the cultures from *Lamarckiana*.

(4) *Oenothera scintillans* is also a plant with smaller leaves and flowers than *Lamarckiana* and also never reaches its height or luxuriance. The foliage is of a darker green and much more smooth and shiny. This plant was early recognized as inconstant, one-third or even two-thirds of its progeny being *Lamarckiana*, and other forms occasionally appear. As a mutant from *Lamarckiana* it is even more rare than *rubrinervis*.

(5) *Oenothera lata* has a foliage of large, strongly crinkled leaves much crowded because of the short internodes. The stems are so weak that the tips of the branches frequently bend.

The buds and flowers are large, but the petals are crumpled, rarely unfolding to their full breadth. However, the most striking peculiarity of this plant is the incomplete development of the anthers which, although large, become dry and shriveled, producing no good pollen. Consequently, *lata* must be cross-pollinated by another species to obtain seed, and this is produced in small quantities in short capsules. *Lata* pollinated by *Lamarckiana* or other forms produces seeds from which a hybrid generation may be grown with varying proportions of *lata*, and because of its pollen sterility this is the only way in which the plant may be propagated. As a derivative from *Lamarckiana* the "mutant" *lata* appears to be rather more common than *oblonga*.

(6) *Oenothera nanella* is one of the most interesting of the "mutants" from *Lamarckiana*. It is a dwarf, with large leaves and large flowers. The height of the plant, eight to twelve inches, is about one-fourth that of *Lamarckiana*, and it breeds true. *Nanella* was also found among wild plants of *Lamarckiana* and constituted about 0.5 per cent of the cultures of De Vries, appearing with great regularity. Other dwarf "mutants" are known, but none of them have the vigor of *nanella*. The most interesting of these is *albida*.

(7) *Oenothera albida*, as the name implies, is a form the leaves of which, developing only a small amount of chlorophyll, appear white or yellowish. As would be expected, the plants, unable to manufacture sufficient food, grow slowly and are weak and sickly. It is difficult to bring *albida* to maturity, for the mortality is great, but De Vries was able to do so and found that the flowers were fairly large. When self-pollinated, *albida* comes true in later generations.

A number of other "mutants" from *Lamarckiana* have been described, some of which are very delicate and others with characters less conspicuous than in the seven forms above described. There were also found among wild plants of *Lamarckiana* two types which have not appeared in the experimental cultures. These are *brevistylis* with short and imperfectly

developed styles and stigmas, and *laevifolia* with narrow smooth leaves. *Brevistylis* is sterile as to its seeds, in contrast to *lata* which produces no fertile pollen and like *lata* can only be maintained by crossing. In this case the fertile pollen of *brevistylis* is used to pollinate some other species, usually *Lamarckiana*, and in the hybrid progeny *brevistylis* again appears.

This remarkable series of studies by De Vries is the most important contribution to the experimental evidence for the mutation theory that has as yet appeared. It is clear that *Oenothera Lamarckiana* is able to give rise to a number of new forms, some with characters sufficiently distinct to rank them as new species. One of the forms, *gigas*, is considered by De Vries to be a progressive "mutant" having in general an organization in advance of that of *Lamarckiana*. On the other hand, *brevistylis*, *rubrinervis* and *nanella* appear to have lost certain features of *Lamarckiana* or to present them in reduced form, and are therefore classed as retrogressive mutants. De Vries believes that in *lata* and *scintillans* characters of remote ancestors reappear and consequently considers these forms as degressive in their nature. Types such as *albida* and other weak forms obviously would not be able to survive the vicissitudes of life in the open and therefore can play no part in the evolution of the Oenotheras. Taken as a whole, the "mutants" from *Lamarckiana* are an impressive group of derivatives illustrating sharp discontinuous variations the results of marked modification in the germinal constitution of the parent plants. De Vries regards their appearance as the origin of new species and properly emphasizes the fact that they do not arise by the accumulation of small variations after the manner postulated by Darwin, but that they appear suddenly and fully developed.

It should be borne in mind that the evidence for the mutation theory does not rest alone upon the experimental studies on *Oenothera Lamarckiana*. Mutations have been described from other species of *Oenothera* and in a number of other groups of plants, as well as in some lines of animals. One striking feature runs generally through the various accounts. The "mutants"

best known have conspicuously the appearance of being retrogressive forms in which a character or group of characters is reduced or becomes lost from the parent line, or degressive when the animal or plant exhibits reversions to ancestral conditions. The accounts of progressive mutations are rare and the evidence submitted has not always been clear or it is subject to other possible interpretations.

It is the general experience of plant and animal breeders that progressive evolution appears most frequently in hybrid stock. On this view is based the general practice of cross-breeding favorable forms of animals and plants to obtain advances in various directions. The crossing of forms selected for desired points gives hybrids more or less complex according to the degree of difference between the parents. Hybrids of the first generation are generally fairly uniform when the parent stock is pure bred. But when hybrids of the first generation are interbred the resulting second generation is characteristically much more varied than the first and among a large range of forms there will usually be found types presenting characters or combination of characters showing progressive evolution. Among hybrids of this second generation will also be found retrogressive forms in which characters of the parents are present in reduced conditions or may even be absent.

Since the rediscovery in 1900 of Mendel's contribution of 1865, referred to at the beginning of this paper, an immense amount of material has been gathered on the inheritance of specific characters which have been followed in their behavior and modifications through long series of hybrid generations. Mendel's laws of inheritance have been tested for numerous characters in a wide range of animals and plants, and the results have justified its fundamental features. Inheritance is very far from being a hit or miss matter, but on the contrary is the expression of laws operating with a precision so exact that many cases of inheritance have already been expressed in terms of mathematical formulæ. I wish that there were time to discuss the principles of Mendelism, which for the past decade have more

fully held the interest of experimental biology and occupied the attention of workers in this field than any other subject, but Mendelism cannot be treated in brief space and I must refrain from more than this reference to its important place in the history of the development of biological science. One of its conclusions, however, affects so directly the critical consideration of the mutation theory that its bearings should be made clear.

We know that the progeny from hybrids frequently consists of a wide range of forms differing in the degree in which their characters are expressed and differing sometimes in the characters themselves. Indeed, some of the various progeny of a hybrid may resemble very closely in certain particulars one of the immediate parents or some more or less distant ancestor. This means that the factors responsible for such ancestral characters have been sorted out of the hybrid complex and brought by some fortunate union of similar sexual cells into the same organism. This process by which factors responsible for characters are distributed in the progeny from hybrids is termed segregation, and the principle of segregation is the most important of the Mendelian laws of inheritance.

There are certain features in the behavior of *Oenothera Lamarckiana* and of other forms believed to be in a state of mutation that strongly suggest the phenomenon of segregation from a hybrid. The "mutants" constitute definite groups and thus resemble segregates and they may be produced repeatedly through a succession of generations thus resembling sets of segregates successively thrown off by a self-perpetuated hybrid. A breeding peculiarity of *Lamarckiana* is further suggestive of a hybrid nature. When certain species of *Oenothera* are pollinated from *Lamarckiana* or some of its "mutants" the hybrid progeny is not uniform, as would be expected of crosses between pure species, but two types of plants result, called by De Vries twin hybrids. It is evident that the male sexual cells of *Lamarckiana* carry two different sets of hereditary factors and this is a condition such as we are led to expect of a hybrid.

The high degree of sterility in *Lamarckiana* also suggests a hybrid organization as was early pointed out by critics of the mutation theory. It is estimated that fifty per cent of its pollen grains and ovules are abortive, never reaching a normal development, and sterile seeds, barren of embryos, constitute one-half or more of the seed output. This is an extraordinary high degree of sterility as compared with some species of *Oenothera* where the pollen and seeds are almost all perfectly developed. It has long been known that hybrids are largely sterile and any plant conspicuously sterile may be properly suspected of hybridity until its history has established it to be derived from pure stock. What is the history of *Lamarckiana?* We are certain of this plant only as a comparatively recent garden product which has not been found as a native species in any flora.

Finally, the results of some experimental crosses that have been made between old, well established or wild species of *Oenothera* show that hybrids may be synthesized with points of strong resemblance to *Oenothera Lamarckiana*. It is as yet too early to know whether these hybrids in later generations will behave in a manner similar to that of *Lamarckiana*, but it seems reasonable to expect that some of them will give rise to successive series of new forms and thus parallel more or less closely the history of *Lamarckiana* when it throws off its so-called mutants. Should it prove possible to synthesize hybrids similar to *Lamarckiana* in structure and activity, the evidence for the mutation theory based on the behavior of this plant will lose much of its value.

There has been a group of naturalists who, from the first appearance of De Vries's account of *Lamarckiana* and its "mutants," have held the belief that *Lamarckiana* was of hybrid origin and that the new forms derived from it are the result of hybrid splitting or segregation rather than the spontaneous generation of new species by mutation. We have noted that there has developed some direct evidence in support of this opinion and it has become apparent that the mutationists will seek and put forward other cases in support of their views.

Already other forms of *Oenothera* are being studied experimentally with the promise of most interesting results, and investigations are by no means confined to this group of plants. It seems probable that the discussion will continue for some time to come before we have reached a basis for general agreement. In the course of these investigations by students holding diverse views there should be uncovered and assembled a much more exact amount of information than is at present available.

Although the mutation theory has an energetic and active set of adherents, it is probably true that the greater number of biologists believe that by far the most important factor in organic evolution is hybridism or the continual crossing of diverse lines. By hybridism is generally implied crossings between forms sufficiently distinct to be called different species or between a species and some well-marked variety, but these are the most extreme types of crosses. The principle of hybridism extends within the limits of the species itself and there are few assemblages of individuals sufficiently alike to be called a species in which some differences between the individuals, greater or less in degree, are not evident. The mingling of diverse germ plasm both within and without the species is generally believed to be the chief cause of the germinal variations through which old characters become modified and new characters arise.

It is, however, true that the germ plasm of the reproductive elements may be modified by subjecting such cells or the tissues that produce them to various chemical or physical experiments. Thus the effects of injurious substances may be studied or the effects of abnormal physical conditions such as may be induced by X-rays or radium emanations. In these cases the reactions may be sharp, giving weakened or poisoned germ plasm that produces degenerate offspring, if at all capable of reproducing itself. The products of such experimental studies are indeed mutations, but they do not help us to an understanding of progressive evolution. Nevertheless, if germ plasm can be affected adversely there must also be conceded the probability

that exceptionally favorable and varied conditions of nourishment may induce modifications in the chemistry of the germ plasm which will lead to advance in its complexity and progress in the organization of the following generations. Such progress would be by mutations, but we have reasons for believing that they would be advances by relatively small steps.

One of the weak points in the theory of De Vries is the small amount of evidence for progressive evolution through mutation. Examples of retrogressive mutation, that is, evolution through loss, seem to be clearly established, and some very remarkable series of reduced and abnormal forms have been described for various lines of animals and plants. Retrogressive mutations usually have little or no chance of surviving the struggle for existence unless they chance better to fit the organism for some peculiar life conditions. In such cases there is not evolutionary advance in organization, but some degeneration or simplification of structure. Such lines of retrogressive evolution, especially well illustrated among parasitic animals and plants, are frequently well marked, but they stand apart from the main problem of organic evolution which is the problem of progressive advance.

We have noted that the most rapid progress in experimental breeding has come as the result of crosses between well-selected parent stock, or from material of well-known or highly probable hybrid origin. The importance of hybridism in its broadest sense as the most important factor of evolutionary progress, therefore makes the strongest appeal to many and perhaps to most biologists of the present day as it did to Darwin and his disciples. Nevertheless, there are strong reasons for believing that chemical and physical factors outside of the organism, which we rather loosely designate as environment, do play a part in exciting the apparently spontaneous modifications of germ plasm, although the changes which they induce may prove to be on the whole small modifications rather than the large germinal variations claimed by the mutationists. Modifications of germ plasm through crossing, and changes due to external

chemical and physical factors would be expected at times to work simultaneously, and in such cases it may become a difficult matter to distinguish their separate effects. Germinal changes, the result of environments, even though small in degree, would, however, if sufficiently numerous, work in time profound modifications of structure, and on this common ground the mutationists and the followers of Darwin seem to have the strongest hopes of reaching an agreement.

THE SPELL OF ARISTOTLE

By William Romaine Newbold

Professor of Intellectual and Moral Philosophy
University of Pennsylvania.

We are prisoners, all of us, throughout the greater part of our lives, prisoners in a prison not the less real because its walls are the immaterial impressions of sense. At every moment of our waking lives, through eye and ear and touch, these impressions shut in our thoughts, cramping and confining them within the narrow limits of the "here" and "now" with all their petty but absorbing interests. The "here" may include our homes and places of business, the span of the "now" may cover a little of the past and of the future, the interests no doubt aspire to something above food and drink and clothing, social and professional success. But on the whole, how thick and strong are the walls, how limited is the range of our habitual thoughts and interests. Rare are the moments when I become conscious of a something within me akin to the Infinite without, a something never content with the goods which those walls enclose because its interests are other than they, a something ever striving to pierce the walls in order to find—what?

Sometimes the walls recede, and one feels one's self a denizen of the infinite abyss of space wherein the myriads of suns with their attendant worlds are lost, and one's thoughts range freely through that Eternity of which the Time, measured by those suns' motions, is but a moment. Yet the walls have only receded—the scientist is still within them.

A few seek in Art a way of escape. In Poetry, Painting and Music the walls seem translucent and for a few brief moments the spirit catches glimpses of a realm of beauty to which it fain would flee away. But the few moments are gone, and the artist finds the walls as opaque and compelling as ever.

Few, again, are those who by sheer power of thought would

make the walls transparent and descry beyond them the secret causes of their being, who would see beyond the world of sense a world of Reality accessible to Reason alone, who would therefore declare themselves free. But the thought of the philosopher falters and fails, the vision fades and he finds himself again a prisoner.

Step with me for a moment over the boundaries of our present "here" and "now." Beyond these walls lies a city with its thousands of inhabitants, each one of them confined within the circle of his own trivial experiences and interests; beyond the city lies the country with its millions; beyond our country are tens and hundreds of millions more, swarming around the great globe of the earth, and each individual of all those millions is shut in from the outer world as you and I are. Look down the centuries of the past and behold these millions preceded by yet other millions and these by others and others and others until they are lost in the shadows of primeval time. An ocean of humanity, an ocean so vast that its shores lie beyond our horizon. And every drop of that ocean is imprisoned within its tiny self; few are they that venture to look beyond it or are susceptible to influences from without.

Wonderful then is the man who not only transcends his own limitations but also penetrates into the close-shut lives of his fellows and makes his influence felt over wide expanses of earth and through centuries of time. A soldier occasionally arises who overwhelms all opposition and rules over many peoples, or a statesman creates institutions which regulate the daily lives of millions. More wonderful than either is the artist, the architect or sculptor or painter or poet or musician, who infuses into dead matter a something endowed with immortality. But surely more wonderful still is the philosopher whose thoughts have lived through centuries and won the assent of generations of men. The soldier's exploits, the statesman's ordinances, the artist's creations, possess a power of appeal which is comprehensible, even if the genius which gave them being is not. But the work of the philosopher is of a different

order altogether. He aims to make the Universe intelligible, to reduce its chaos to order, to determine whence it came and whither it is going, to determine the relation of every part to the Whole and All. A stupendous task! Many have essayed it, but how difficult it is to succeed! They are but few who will listen and fewer still are they that will be convinced.

Of all philosophers that ever lived, not one perhaps has been so successful as Aristotle. Plato has, indeed, exerted a greater influence upon the general course of thought. His works have been more widely read and the traces of his ideas may be seen in every occidental literature, ancient and modern. But his philosophy proper, his systematic organization and description of the Universe, may be said to have died with him. Even his two pupils who succeeded him, Speusippus and Xenocrates, diverged widely from their master, and within eighty years of Plato's death his most distinctive doctrines were openly scouted by those who occupied his chair in the Academy. In the nine hundred years that elapsed before the flickering flame of Greek philosophy was finally extinguished by Justinian, one cannot name a single individual who accepted Plato's system in the form in which Plato had left it.

Not very different at the outset was the fate of Aristotle's philosophy. As a system it never enjoyed any considerable vogue in the ancient world, and one cannot trace its influence upon literature at large, as one can Plato's. Upon the development of science Aristotle's influence was much greater than Plato's; his Logic, Physics, Chemistry, Psychology, Zoölogy and Ethics were known to all the thinkers who followed him and were more or less used by them all except by the Epicureans and Sceptics, but the period of his greatest influence was still far in the future.

In the sixth century after Christ Justinian closed the Neo-Platonic school at Athens. It was the death-blow of the ancient philosophy. For more than two hundred years the spirit of free inquiry had been struggling for breath in the stifling atmosphere of religious intolerance; it now gave up the effort

and in a generation was practically extinct. For six centuries the Christian world, both Greek and Latin, knew no other philosophy than the theology of the Fathers. A few scholars in the Greek cities and monasteries still read the ancient authors; but the reading gave no stimulus to independent thought, and in the western, Latin world the Greek writers were almost wholly unknown.

In the seventh century Mohammed led the hordes of Arabia to the conquest of nearly half the civilized world. The torrent overwhelmed the East as far as the northern border of Syria, flowed westward along the African coast to the Atlantic, crossed the Straits of Gibraltar, flooded Spain, poured through the passes of the Pyrenees, and then its course was stayed at Tours by Charles Martel. But the Arabs were more than warriors; they were an intelligent and able race and they appropriated not only the material but also the intellectual wealth of the conquered lands. The masterpieces of Greek philosophy and science were speedily translated into Arabic, and at Baghdad and Cairo, Seville, Cordova and Toledo, the teachings of Plato, Aristotle and Plotinus found docile pupils, who in turn incited the Jews to pursue similar studies. In this movement the influence of Aristotle soon became paramount. In the twelfth century, for example, Maimonides, the greatest of the Jewish philosophers, endeavors to prove the harmony of the teachings of Moses with those of Aristotle, and in the next generation Averroes, the most eminent and influential of the Arabs, declares that Aristotle's doctrine is the highest truth and that Aristotle himself is the standard and model of human perfection, given us by the Providence of God in order that we may know all that can be known.

From the Arabic and Hebrew translations of Aristotle's works Latin versions were made and found their way into France. In this roundabout fashion was western Europe introduced to its master! At first it refused to acknowledge him. In the early thirteenth century the study of Aristotle's works was forbidden by the Church, but the prohibition was soon removed. The

inaccurate translations from the Arabic and Hebrew were replaced by more correct translations from the Greek original, the professors of the University of Paris devoted themselves to studying them, and from Paris the movement spread throughout the learned world. It was soon discovered that the philosophy of Aristotle was entirely compatible with the doctrines of the Church—nay, more, that Aristotle had been inspired of God to produce a philosophy which would illustrate, amplify and powerfully support the Catholic theology. He became known as "The Philosopher," extravagant encomiums were showered upon him; it was even alleged that he was Christ's precusor in the realm of science as John the Baptist had been in that of religion. His philosophy was combined with orthodox theology in several scholastic systems, differing in numerous and sometimes important details, but all alike in that all employed Aristotle's language and methods and professed to give the only correct interpretation of his thought. Finally accepted, although not without a struggle, as the official philosophy of the Church, the system of Aristotle, thus rewritten, became authoritative in every school and university of Europe and shaped the mind of every educated man for more than four hundred years. During this period the modern European languages were rising from the position of vulgar tongues to the dignity of cultivated mediums of expression, and thus it was that the chief Aristotelian technical terms, such as substance, accident, attribute, substratum, matter, subject, essence, form, genus, species, term, proposition, conclusion, induction, etc., entered into nearly all the languages of Europe.

During the general dissolution of the medieval order, of which the Renaissance and the Reformation are the best-known symptoms, not a few bold spirits sought to break away from the scholastic philosophy, but they found themselves all but helpless. They had no words wherein to express themselves except those of Aristotle and his interpreters; indeed, one might almost say that they had no ideas to express which had not been cast in the same mold. Read Pomponazzi or Patrizzi or Taurellus or

Bruno or Carpenter, or even Descartes or Spinoza, and observe how hampered they are at every turn by the scholastic terminology and habit of thought. Indeed, the first thinker I know of who really cast off the shackles and found new words for new ideas was that typically blunt and honest Englishman, Thomas Hobbes, of Malmesbury.

By the end of the seventeenth century the new movement was well under way in England, Holland and Germany, although the scholastic methods still survived in many quarters, but in all Roman Catholic countries the scholastic systems still held almost undisputed sway. Indeed, to this present day, the chief thirteenth century system, that of Thomas Aquinas, is the official philosophy, I believe, of the Roman Church and is taught very generally in its schools and universities throughout the world.

It would seem then that no philosopher that ever lived has so fascinated the minds of men as has Aristotle. During the eight hundred years immediately following his death he influenced, but did not overawe, the philosophers of the Greek and Roman world; sixteen hundred years after his death he was rediscovered, for four hundred years he reigned with undisputed sway over western Europe, and has maintained a large part of that authority for four hundred years more wherever the Roman Catholic Church prevails. What is the secret of his spell? What manner of man was he, and how comes it that the thoughts which flitted before his mind's eye in the fourth century before Christ, and which he committed to his tablets of wax or scarcely more durable papyrus sheets, are still a living power in our modern world, affecting the thoughts and lives of hundreds of thousands of human beings as intelligent and cultivated as ourselves?

Aristotle was born in the Greek colony of Stagira on the coast of Thessaly or of Thrace—the question whether it belonged to the one or the other was disputed in antiquity—in the year 384 B. C. His father Nicomachus was the physician and friend of Amyntas, King of Macedonia, and Aristotle probably received

his first impressions of the world in the surroundings of the Macedonian court. No doubt he there acquired certain characteristics which distinguished him throughout his life. Philosopher as he was, he was always very much of a fine gentleman, courtier and man of fashion. In small things as in great he displayed a taste for elegance which seems at times to have verged upon a liking for display. We are told, for example, that his attire was "distinguished," that he wore rings and kept his hair close cut—fashionable innovations which the more conservative Athenians regarded with disapproval. The same tastes no doubt found expression in the conduct of his household and gave color to the charges of luxurious living which were brought against him by his enemies. One can trace them again in his will, where he directs that no less than five statues shall be erected in memory of certain friends and relatives—an expression of gratitude which, however creditable to the testator, would certainly go quite as far towards perpetuating his own memory as that of the persons thus honored. One cannot but feel, as one reads his sketch of the "highminded" or proud man, that he has there portrayed himself, or himself as he would have wished himself to be. The highminded man has such a well-grounded consciousness of his own excellence that he is unaffected by the elation which smaller men feel upon receiving wealth, honors and offices, for he knows them to be less than his due, or by depression upon failing to receive them, for his excellence alone suffices him; he is ready to grant, reluctant to receive a favor, for to grant one is becoming, to receive one is unbecoming a person so superior to others as himself; he is dignified with the great, affable with the humble; he is indolent, candid, slow of movement, deep of voice, sparing and deliberate of speech. But niggard Nature had begrudged Aristotle a body fitted to express this ideal greatness of soul. He was small and thin, he had an impediment in his speech, in later life he was bald. His health was frail and his unremitting intellectual labor seems to have wrecked early in life his naturally feeble constitution, for he was a chronic invalid for many

years before his death. His countenance, however, if we may trust to the portraits still extant, went far towards compensating for these minor disadvantages. The broad brow, the clearly cut, refined features, the firm lips, suggest, even in the second-rate copies which have survived to our time, the keen intellect and indomitable will that once informed them.

He was left an orphan in his boyhood, apparently the sole heir to a considerable estate. The first use he made of his independence seems to have been to leave home and friends in pursuit of that knowledge for which his soul thirsted. There was but one spot on the earth where he might hope to satisfy that craving—a certain small house with a garden attached, out in the country about a mile and a half outside the walls and north of Athens, where Plato had now made his home for about twenty years. His fame had spread from one end of the Greek world to the other, students were flocking to hear him, and thither Aristotle must have been irresistibly drawn.

Would you not like to have been present at the first meeting of those two? Your mortal eyes would have seen, no doubt, nothing very impressive—a handsome, broad-shouldered, heavily built man of sixty years or thereabout, greeting a slender, delicate boy of seventeen and doing all that courtesy could suggest to make him feel welcome. But if your spiritual eye could have pierced the curtain of sense, you would have seen face to face—I might almost say in collision—two contrasting types of the human spirit—Plato, aspiring, visionary if you please, painfully conscious of the limitations of sense and of matter, restlessly eager to pass beyond them into the supersensible, the ideal, the pure, the ineffable—Aristotle, sensible, practical, conscious indeed of ignorance and resolved to extend the bounds of knowledge, but content to find the substance of knowledge within the limits of everyday experience. It was a momentous meeting. These two were destined to remain in intimate association for more than twenty years, each profoundly modifying the thought of the other, yet not so profoundly as to erase its distinctive characteristics, and from these

two were to issue two distinct streams of influence which would affect the destinies of nations as yet unborn.

When Plato died, at the age of eighty, Aristotle was thirty-seven years old. Plato had long since recognized his ability; indeed, tradition relates that he used to call him the "brains of the school," but was too well aware of the fundamental differences between their points of view to consider appointing him his successor. That honor fell to Plato's nephew, Speusippus, while Aristotle, with another of Plato's pupils, Xenocrates, went to the court of his friend and former fellow-pupil, Hermias, tyrant of Atarneus, a small city in Asia Minor. Here Aristotle remained three years acting as Hermias' adviser in statecraft and legislation. But Atarneus was overwhelmed in a Persian invasion, Hermias was killed and Aristotle was forced to flee to Mitylene. He married while in Atarneus a young girl named Pythias, a relative of Hermias, and had by her one child, a daughter. The marriage seems to have been a happy one. Pythias died before her husband, and when Aristotle wrote his will he directs that her body shall be removed from its temporary resting-place and interred, in accordance with her last wish, beside his own.

A year or so after the destruction of Atarneus, Aristotle was recalled to the Macedonian court by King Philip to take charge of the education of the prince who was to be known as Alexander the Great, then about twelve years old. For eight years or so the two conquerors-to-be, the one of men's bodies, the other of their minds, must have been in almost daily intercourse. It is a striking testimonial to the compelling force of the intellect and the character that dwelt in Aristotle's frail body that he was able not only to maintain so long his ascendency over the lion's whelp, but also to awaken in him enduring intellectual interests and to inspire an affection which survived nearly ten years of separation filled with intrigues and slanders. It is true that shortly before the end of his career Alexander began to question even Aristotle's fidelity, but the marvel is that his faith in his former tutor endured so long.

When Alexander succeeded his father in 336 B. C. Aristotle returned to Athens, after twelve years' absence, and opened a school like that of Plato. Plato had usually met his pupils at the Academy, a gymnasium not far from his house, and Aristotle adopted a similar practice. A little over a mile southeast of the Academy, not far from where the Royal Palace now stands, was a gymnasium known as the Lyceum. It was, no doubt, like the Academy, a park-like enclosure, well shaded with trees, with pleasant walks and benches upon which to rest. Like other gymnasia, it was devoted especially to the athletic training of the Athenian boys, but was also frequented by the boys' fathers and friends, who found in the gymnasia agreeable surroundings for the outdoor social life in which so much of their time was passed. There Aristotle used to meet his pupils twice every day and taught while walking around the shady paths. It was from this custom of walking while teaching that the school and the philosophy which it represented came to be termed "Peripatetic." The "morning walk," as it was called, was reserved for advanced students and was devoted to the exposition of Aristotle's technical philosophy, but to the "evening walk" beginners were admitted and the themes were handled in lighter, more popular style. During the morning walk Aristotle usually read one of his more formal treatises, adding such oral exposition as he thought necessary, but sometimes he talked from brief notes. One set of such lecture notes still exists, incorporated into the twelfth book of the Metaphysics. During the evening walk he probably read one of the more popular works, such as the dialogues or works on history. Possibly it was during the evening walks that he held his seminar, as we should call it today, of which the bulky book of Problems constitutes such an interesting memorial. Diogenes says that he made rules for the conduct of the discussions and every ten days appointed a "President." The "President" was, no doubt, one of the more advanced students and it has been supposed that he maintained on stated occasions a given thesis against the attacks of his fellow-pupils. But the evidence

of the book of Problems goes rather to show that the duty of the President was to propose problems in any branch of science and to criticise the solutions offered by the others. The book contains the problems together with rough notes upon the various solutions, the whole being classified under thirty-eight headings. No other of Aristotle's works gives so vivid an impression of the range of his scientific interests. But of this I shall speak again. Besides the walks, Aristotle also used as a means of instruction formal dinners. Every pupil was expected to dress for these dinners and the exercises were conducted, as in a modern German *Kneipe*, in accordance with a code of rules, but of the details we know nothing.

Aristotle taught in Athens more than twelve years and during the whole of this time he was in constant communication with Alexander, who was engaged in his eastern campaign. It is said that he used to send Aristotle gifts of money for the prosecution of his scientific work and specimens of rare plants and animals picked up in the strange countries in which he was fighting. Then came the catastrophe. Alexander died in Babylon, his generals proceeded to divide his dominions among themselves, and Aristotle found himself in a very critical situation. I can depict it better perhaps by a simile than by a description. We will suppose that the German Emperor, after stamping out all resistance in western Europe, leads his armies on a victorious campaign through Asia to China. Before departing he sends a distinguished German professor, his own former tutor and intimate friend, to Paris to found a new university as a rival to the Sorbonne. The new university is a brilliant success, its halls are crowded and the Sorbonne deserted; it constantly receives gifts from the emperor of money and antiquities. Then the emperor dies suddenly, and his empire falls in pieces overnight. What would be the position of his friend in Paris? I will add that the Archbishop of Paris publicly charges the German professor with having celebrated a mock mass in which he substituted the name of Nietzsche for that of Christ and the name of his own deceased wife for that of the

Virgin Mary—for the charge which the hierophant brought against Aristotle, of offering sacrifices to Hermias and of making to Pythias the same offering which the Athenians made to Demeter, shocked Athenian religious sentiment much as these imaginary charges of mine would shock Catholic Paris. Aristotle realized that the danger was imminent. He left Athens for Chalkis in the island of Euboea and there died a natural death the following year, 322 B. C., in the sixty-third year of his age. In 1892 Prof. Charles Waldstein, then the head of the American School at Athens, discovered near Chalkis a fourth-century grave containing, besides human remains, a gold chaplet and a steel pen. In the same family enclosure was a grave of a century or so later, bearing the name "Bioté, daughter of Aristotle." The pen and the chaplet indicated that the grave was that of a distinguished man of letters. Aristotle had no daughter named Bioté, but he had a grandson named Aristotle, and Bioté might have been the grandson's daughter. Waldstein inferred that he had found the grave of Aristotle. The evidence is far from conclusive, but is good as far as it goes, and when I was in Athens some years ago I looked with a reverence which I hope was not misplaced upon these supposed relics of the man who had been my daily companion for so many years.

Throughout his life Aristotle had been a hard worker. He was the first to see in its true light the importance of the history of thought; he collected a library of philosophy and diligently studied the works of his predecessors. Plato is said to have dubbed him "the Reader," and Aulus Gellius relates that in order to keep himself awake while reading he used to hold in his hand a brass ball suspended over a brass basin on the floor; if his attention relaxed his hand would relax also, the ball would drop into the basin and arouse him. The anecdote finds unexpected confirmation in some passages of the Metaphysics, where he several times refers to "this brass ball" as his standard representative of an object of sense. Obviously, for some reason, he had a brass ball at hand as he wrote. But his

industry was not entirely or chiefly devoted to the history of philosophy. He had a passion for facts and must have gathered them from every possible quarter. He wrote histories of the constitutions of no less than 158 states. All of these constitutions had been lost, but in 1891 one of them, the Constitution of Athens, was discovered in Egypt. In like manner he collected and classified all sorts of information about animals. This collection is still extant and is known as the "Historia Animalium." If the titles are to be trusted of works now lost but ascribed to him, he made many other similar collections. But all this labor was merely preliminary to what he regarded as the only important work—the formulation of the sciences. The constitutional histories provided a basis for his theory of politics; the "descriptions" and "dissections" of animals for his long series of physiological and psychological works; the collections of the different systems of rhetoric for his own Rhetoric; his studies of the Pythagoreans, of Plato and other philosophers, provided material for the historical introductions which he nearly always prefixes to his scientific works. And it is upon these systematic works in the various fields of science and philosophy that his fame rests. A stupendous achievement they are. They cover almost the whole field of pure science known to the ancients—Logic, which was Aristotle's own creation; First Philosophy or Metaphysics, Second Philosophy or Science of Nature, which roughly corresponds to our sciences of Physics, Chemistry, Meteorology, Psychology, Psycho-physics, Zoölogy, Physiology; then the sciences which deal with Man—Ethics, Politics, Æsthetics and Rhetoric. The only fields in which Aristotle left no work of importance were Astronomy, Medicine, Geography and Music, but we have ample evidence that he worked in these fields also. Indeed, he bequeathed to succeeding generations not merely a system of philosophy but a veritable encyclopedia of the sciences so vast that the prospect of trying to master it is enough to daunt the most enthusiastic of students. Few of them, I fancy, will ever forget their first initiation into the thoughts of "The Philosopher." The

prodigious bulk of his works is not puffed and padded with superfluities, such as anecdotes, illustrations and literary adornments. It matters little where one begins to read, for all Aristotle's books are very much alike in form. Every paragraph contains the least possible number of sentences in which the thought could be expressed, every sentence is stripped bare of every superfluous word, and the number of words needful is reduced as far as possible by the use of a comprehensive and accurate system of technical terms. Learning to read Aristotle is not unlike learning the symbols of algebra. Indeed, there are many pages, especially of his Analytics and Physics, where he uses words and phrases in meanings so arbitrary that they are hardly more than symbols, and frequently substitutes letters for words. Very often he employs letters as a means of reference to an appended figure, such as those used in geometry, but in no case, so far as I am aware, has the original figure been transmitted by the copyists of our manuscripts. When, however, one has mastered the initial difficulties, there is a charm in Aristotle's language which makes it easy to believe the testimony of Cicero, Themistius and Ammonius to the beauty of his purely literary works. The unadorned simplicity and terse precision of his sentences, the exquisite lucidity of his thinking, have a beauty all their own, not approached by any other writer known to me.

When one has at last entered into Aristotle's universe, one finds one's self in a world very different from that of the twentieth century. Vast it is, but not as our universe is vast. There are no myriads of suns with their attendant planets hurtling through the infinite abyss of space to impress upon man his infinite littleness, no conception of long ages of evolution required to lift man from nothingness to that pinnacle of insignificance from which he now so proudly surveys the universe. Aristotle's world is vast as a cathedral is vast—stupendous, beautiful, sublime if you will, but finite none the less, knowable to man from foundation to the loftiest of its soaring spires, nay, more, somehow akin to man, in that it

reveals an intelligence like to his own. The individual man is but an evanescent bubble on the stream of becomings, but "Man," the species, is eternal, and in his proper sphere, the earth, is the only representative of God, the Prime Mover of the All, for he alone possesses a spark of the Divine Intelligence and by virtue of it can in a measure comprehend the Infinite First Cause upon which his being depends.

This mighty universe is a perfect sphere, its center the earth, its outmost boundary the star-strewn sky. Beyond that boundary is neither space nor time, only Eternity and God. Within, the great Sphere is subdivided into two chief divisions. The inmost is a smaller sphere in the surface of which lies the orbit of the moon; a still smaller sphere, the earth, is its center and core. The space between the earth and the moon is filled with water, air and fire. Within this sublunar region prevail eternally genesis, dissolution and all kinds of change. The outmost division of the great Sphere is that which lies between the sublunar sphere and the bounding sky. It is composed of the transparent Fifth Substance which admits of one kind of change only, revolution, and is subdivided into a large number of concentric spheres revolving in different directions and carrying with them the planets.

Such is the external body, so to speak, of Aristotle's universe. But the piercing eye of The Philosopher was not content to rest upon the surface of the All—it sought to behold its innermost structure, the underlying ultimate Reality. In the midmost region, the sublunar, there are two kinds of Reality, Matter and Form. In the strict sense of the word there is but one "Matter," namely, "Substratum," a something of which the entire sublunar sphere consists, itself possessed of no qualities whatever, never directly apprehended, known only by inference or analogy as the bearer of the lowest Forms, in combination with which it exists from eternity to eternity. The Forms are indefinitely numerous. Every individualized thing spontaneously occurring in the universe is what it is by virtue of a specific principle or Form. This is represented in thought by the "concept" of the

thing and is described in language by the "definition." The lowest of the Forms are Hot, Cold, Wet, Dry; combined in pairs with Substratum they constitute the four primary natural substances, earth, water, air, fire. Each of these substances can change into any of the others, and they combine one with another in varying proportions to form the "homogeneous substances" such as the various metals and minerals, such organic substances as oil, wine, wood, flesh, blood, bone, hair, teeth, each possessed of a definite set of properties or functions which constitutes its Form. Thus the construction of the universe may be compared to that of human society. In society, individuals are organized into families, families into communities, communities into states, states into empires. So also in the universe as one ascends in the scale of perfection, each individualized thing, composed of Matter and Form, may serve as Matter to a higher Form, and the resulting thing ranks higher on the scale of being. But the scale is not of infinite range. At the one extreme lies Substratum, formless Matter, beneath which there is no lower Matter, at the other is God, Absolute Matterless Form, above whom there is no higher Form.

Such is Aristotle's conception of the underlying structure of the universe. But every part of this universe is instinct with motion. The spheres of the supralunar region revolve ceaselessly upon their axes; in the sublunar region air and fire are forever struggling upward, water and earth descending downward; all four of the primary natural substances are forever suffering transformation, each into the other, and since all sublunar things consist of them, those things also necessarily share their endless transformations. Nothing endures. With Heraclitus Aristotle can say, "All things are flowing"; "War is Father of all and King of all." How then does Aristotle explain this world process of motion and change?

First of all, observe that it is eternal. Such conceptions as those of evolution, of the actualization of a divine plan in the history of the universe, Aristotle explicitly rejects. They had been advanced before his time and he was familiar with them,

but he will have none of then. As the universe is today, such has it, in all essentials, always been. Individuals are born, grow to maturity, decline and perish to make way for others; families, communities, nations, civilizations, pass through the same process. In a sense there is an evolution of everything that exists, but it is an evolution that moves in a circle. It has no higher end to achieve. Its only purpose is to arise from nothingness to something, in order to sink back into nothingness again.

But what is the Power which is operating in this endless process of Becoming? That is a question to which no short and simple answer can be given. Aristotle himself conceived of that Power in at least three different ways. Whether the three are but different ways of expressing one theory, or are three distinct and incompatible theories, are questions upon which students of Aristotle never have agreed and probably never will agree. I shall not attempt to reconcile them, but shall state them as simply as possible, and I think you will find that each taken singly is not at all difficult to understand.

The first theory views the universe as a machine. The revolving heaven outside is the flywheel of the engine, so to speak, which communicates power to the whole machine. The sun's heat is the medium which transmits the power to the earth. Heat is the active principle; it plays the part played by force in modern science. It enters into all existing things, it transforms and transmutes them and thus keeps the eternal process going. As the sun moves from north to south the distribution of heat fluctuates and with it fluctuates the tide of change. In summer it flows full and strong; in winter it ebbs, and all the world becomes relatively dead and still. But if the sky is the flywheel of the world engine, whence comes the power that keeps it in revolution? From God, replies Aristotle. God exists beyond the heaven; He is the Motionless First Mover, who by the mere power of His thought causes the heaven to revolve and through it transmits the stream of energy to the farthest recesses of the material universe.

This first theory, since it conceives the world as a machine, quite fails to explain the presence of Form in it. The second theory conceives it after the analogy of a living organism. It consists, as before, of Substratum and Form, but Form is regarded as the effect of a cause, called "Nature," which is conceived as an active working force always tending to produce a Form. It is, in short, very nearly the same as what we call the vital principle. In the acorn resides a Nature which will mold earth and water into a perfectly formed oak tree. Even inanimate objects such as iron contain a Nature which gives them their characteristic properties.

From this point of view the universe is simply an aggregate of Natures, some of low grade, such as those which form inanimate objects; others higher, as those of plants and animals. Each has but the one end—to confer upon matter its own specific Form, and the higher Natures are able to utilize the lower in the accomplishment of their ends, as the Nature which dwells in each of us is able to convert bread and other kinds of food into flesh, blood and bones. Manifestly, if such a world as this is to have any unity, its unity must be derived from some one supreme Nature, that of the universe itself, which is related to all the others as each of the higher is related to each of the lower—in other words, something like what Plato calls the world-soul. But Aristotle gives us nothing of the kind. God indeed is the crown and head of the universe, but the relation of the Natures to God is not explained.

The third theory, if we could but credit Aristotle with it, would supply the lack. Aristotle never develops it, and sometimes he seems to repudiate it, but in many passages he uses language which distinctly implies it. At all events, it has been accepted by many as his, and has exerted no little influence upon later speculation.

It gives an explanation of the origin of the Natures. Every Nature is the effect produced upon Substratum by one of God's thoughts. The thoughts in the mind of God, each of which is a perfect immaterial Form, affect formless Substratum from afar

as the magnet affects the iron-filings, and Substratum responds by trying to copy the thought. The copy is always imperfect, and, because composed of Substratum, it is necessarily perishable. Each one of us, for example, is such a copy of God's thought of the perfect human being; each one perishes, but the species "Man" never perishes, because God's thought is eternal and Substratum cannot but respond to its attraction. Thus every nature is what it is, because it represents a divine thought, and the universe as a whole is nothing but an imperfect copy, forever being made, unmade and remade, of God's thought of the perfect universe.

Such are the rough outlines of the Aristotelian philosophy. Why did it exert such a fascination upon the minds of the medieval thinkers?

First and chiefly because of its sublime simplicity. I have said that Aristotle's world is vast as a cathedral is vast. I might go further and say that it has the simplicity of the Gothic cathedral. "Simplicity!" you will say, "could anything be less simple than a Gothic cathedral?" Yes, a cathedral is in a sense simple. As a whole it possesses a unity which the mind can grasp as such, and through all the multifarious details which enter into the composition of that unity there run identical elements endlessly repeated, identities of line and curve, of moldings and arches and windows, of groining and columns, of aisle with aisle and transept with transept—one's thought staggers at the prospect of appreciating severally all the identities reiterated over and over again throughout the glorious whole. And in like manner Aristotle's universe, notwithstanding some defects, is a harmonious whole, within which the eye of thought discerns a rhythmic structure endlessly diversified and yet ever fundamentally the same. Its material is Substratum, its harmonic principle is the antithesis of Matter and Form. This antithesis occurs in many different contexts. In Logic, for example, it is called Opposition and presents itself in four distinct kinds; in Physics and Chemistry it is called Genesis-Dissolution and again has four kinds; in Metaphysics

it is called Matter and Form, Potentiality and Actuality. But essentially it is everywhere the same relation, and wherever one looks in Aristotle's world, one sees it always the same and yet never quite the same. Hence the Aristotelian philosophy really has something of the rhythm and harmony characteristic of works of art, like the cadence of prose, the rhythm of verse, the symmetrical elements of architecture. The simplicity of this architectonic principle contrasted with the infinite diversity of the contexts in which it occurs; the marvelous ease with which this magic formula reduces disorder to order, chaos to cosmos, has irresistibly attracted many an inquirer craving for intellectual peace.

But Aristotle's thought possessed still more potent spells wherewith to charm the men of the Middle Age. In the first place, with all its scientific elaboration of detail, Aristotle's world was not very different from the world as conceived by the common man in the thirteenth century. Aristotle knew well systems of thought far bolder in the range of their speculations than his own. The infinity of the universe had been acknowledged by many of his predecessors; the Pythagoreans even conceived the earth itself as one of the planets revolving about the central Fire. But he rejected all such soaring theories in favor of the conviction of common sense, that the sky is the boundary of the universe. Even his architectonic principles are for the most part taken direct from ideas familiar to common sense, albeit carefully criticised with the aim of removing from them the ambiguities inherent in their ordinary usages. Hence his system found the readier acceptance because men's preconceived opinions were so easily assimilated to it. Moreover, the comprehension of Aristotle's philosophy was made much easier for the men of the thirteenth century by the fact that all educated men possessed some rudimentary comprehension of some of his most important ideas. Two of his elementary logical works, the Categories and the De Interpretatione, together with Porphyry's Introduction to the Categories and Boethius' Commentary on the De Interpretatione, had been current throughout the

Middle Ages, and had been the staple logical and philosophical studies of the schools. Men who were familiar with these books had much less difficulty in understanding the more comprehensive works when discovered than they would otherwise have had.

Another powerful factor in winning a hearing for Aristotle was the immense amount of concrete information which his books contained. Throughout the early Middle Age the dominant, indeed almost the sole interest had been the theological. No knowledge was valued except that which bore upon the way of salvation. But in the thirteenth century the scientific spirit was awakening from its long sleep and looking curiously out upon the world of nature. To men who felt this craving for knowledge Aristotle's books were treasure-trove indeed. Here one could learn all about the structure and habits of all kinds of beasts and birds and fishes and insects, all the mysteries of reproduction, here one would find amazingly ingenious guesses at the why's and wherefore's of multitudes of facts or supposed facts. Take for example a few instances from that book of Problems to which I before referred. Why do wounds of the head heal more quickly in marshy regions than wounds of the shins; why is disease less prevalent, but more fatal in winter than in summer; why are drunkards especially subject to pleurisy; why does wine mixed with water, if taken strong, give a worse headache next morning than pure wine; why does wine make men both stupid and excited; why are drunken men inclined to weep; why does the way seem longer when one does not know how far one has to go; why does walking make the thighs ache more than the shins; why does a sedentary life make some people fat and others thin; why is rising from a sitting posture more likely to make one giddy than sitting down; why do we yawn in response to a yawn, but do not imitate other movements; why does the hair stand on end when one is frightened; why do men sneeze more frequently than beasts; why have all animals an even number of legs; why have human beings no mane; why do deaf people talk through

their noses; why is it that some people cannot read without going to sleep, whether they wish to or not; why is bread better hot than cold, and why is it improved by being warmed over; why does water feel hotter when one moves one's foot in it than when one keeps it quiet; why is it that the voice, hand, and upper lip tremble most when one is frightened; why is it a worse crime to kill a woman than a man; why is it more disgraceful to embezzle a small trust-fund than to abscond with a larger sum of borrowed money; why can one stop a sneeze by rubbing the eye; why do our eyes redden with anger but our ears with shame; why do those who are blind from birth never become bald; why are sneezes between midnight and midday unlucky and those between midday and midnight lucky; why are the teeth, although harder than flesh, more sensitive to cold; why are the lips the most ticklish part of the body; why cannot one tickle one's self?

These studies in the science of nature were, however, not the most valuable part of Aristotle's work. Logic was his great achievement. Plato had paid a good deal of attention to logical problems and one will find in his dialogues many acute suggestions, but the science of Logic was almost wholly Aristotle's own work. So thoroughly was it done that no man was able to criticise it effectively or to improve upon it in any important particular until the middle of the nineteenth century. His Psychology, Ethics, Politics and Poetics also contain much which is still of value.

I have given you three chief reasons why Aristotle's philosophy so gripped the minds of medieval scholars. The first was the symmetrical perfection of his system, the second was the fact that certain of its leading ideas were already familiar, the third was the immense store of facts and explanations of facts which it contained. I must now give you a fourth which is much more difficult than the others to explain in a few words, but which is of especial importance, not only because it favored the acceptance of his doctrines, but also and chiefly because it explains as nothing else can how Aristotle's system came into

being and why it was what it was. This is his theory of knowledge and of the method of science.

Aristotle's use of the word "knowledge" differs from that current in his day and in ours. For example, you no doubt would say that you "know" that I am now talking to you. Aristotle would not. It is true that I am now talking to you, but it was not true a few minutes ago and it will not be true a few minutes hence. But "knowledge" is eternally true, according to Aristotle. For example, the statement that things equal to the same thing are equal to each other, expresses knowledge, for it is true from eternity to eternity. The object of knowledge also must be necessarily immutable and eternal. If not, it might change or cease to exist, and then the knowledge referring to it which formerly was true would be true no longer, in which event, according to Aristotle's definition of knowledge, it never was knowledge at all.

What are the sources of knowledge? Or, to put it more precisely, what are the intellectual processes which enable us to acquire it? Aristotle says there are two, Intuition and Reasoning. Reasoning is a process of combining two known truths in such a way as to derive from them a third which was not known. The new truth is then said to be "demonstrated" by the truths from which it is derived. Aristotle devoted much labor to the analysis of these processes of reasoning and reduced them all to a limited number of types which he called "syllogisms." The fundamental type of all syllogisms is of the form, All B is A, All C is B, All C is A.

Reasoning obviously presupposes that the reasoner already has some truths in mind from which to reason to new ones. Where did he get them? Some he might have got from reasoning, but he could not get all in that way. The chain of syllogisms must begin somewhere. Where then did he get the first truths from which all reasoned or demonstrated truths are derived? Aristotle replies that he got them from Intuition. Intuition is a kind of intellectual perception by which we immediately perceive abstract ideas and abstract truths very much as we

perceive concrete things through our senses. It is, for example, Intuition which perceives that if equals be added to equals the sums will be equal. You cannot prove it and you do not need to. You only have to look at it, so to speak, with this eye of your mind and you immediately perceive both that it is true and that it is necessarily true.

So Aristotle's ideal scientific method consists of two steps. First, you must discover by Intuition the highest possible truths, the first principles of knowledge. Second, you construct syllogisms out of them and deduce from them as many conclusions as possible. The first principles together with the conclusions derived from them constitute the whole of knowledge proper.

But how could Aristotle reconcile this theory with the patent fact that it is quite impossible to spin the whole of knowledge out of one's own head as the spider spins her web? Sense-perception may not give knowledge immediately, but that it is somehow helpful in acquiring knowledge and that one cannot get all knowledge without it is self-evident to any hard-headed, practical man. Now, Aristotle was an eminently practical man. He had been trained as a physician in youth, and throughout his life retained the practical common sense which is to this day such a marked characteristic of doctors. In fact, as I have already shown, he did not himself rely wholly or chiefly upon this ideal method. He was a most diligent collector of facts ascertained by sense-experience, and based his formal science upon such collections. How then did he explain the relation of Sense-perception to Intuition?

Sense-perception is necessary, he said, to the acquisition of knowledge, because without its aid Intuition could never apprehend the first principles at all. Intuition perceives that the straight line is determined by two points, but it is only through our sense-perceptions of edges and the like that Intuition is ever brought to the conceptions of "line" and "point" at all. So also Intuition grasps the concept of "unit" and by repeating it constructs the numbers, but it never could have apprehended

the "unit" if Sense-perception had not already perceived myriads of things each of which was "one." Thus the perceptions of sense are a kind of crude material from which Intuition distils the true objects of knowledge.

Important, therefore, as is the rôle which Aristotle assigns to Sense-perception in his theory of knowledge, it is altogether subsidiary. When Intuition has once apprehended the concept or principle one needs Sense-perception no longer. But in very many cases, and those the most important, it is not necessary to invoke immediate Sense-perception at all. Every man possesses already millions of such percepts stored up in his memory, stereotyped in his opinions and associated with the words which he uses. In fact, one may go further. The language used by any race carries with it, in the form of meanings, the net result of the race's experience through countless centuries, each generation transmitting its knowledge to the next merely in teaching the language. Hence, so far as the ordinary events of daily life are concerned, one may substitute the meanings of words and the received opinions of men for immediate Sense-perception.

This is precisely what Aristotle does. He begins each important discussion with a survey of these opinions, as held by ordinary men, or as refined in the theories of the philosophers; he considers what he calls the ἀπορίαι or the difficulties and inconsistencies embedded in them, and he carefully scrutinizes the meanings of the words in which they are expressed. Then he endeavors to extract from this miscellaneous material the residuum of sound knowledge which it contains.

Now it is true that this method will yield a considerable amount of knowledge. For example, take the word "rose." A critical examination of all the ideas and opinions associated with the word will result in assembling and classifying what people know about roses. The principle involved may be illustrated from another field. In the '40's it was discovered that the sandy beds of many streams in California contained particles of gold. They had at one time been embedded in the solid rock of the mountains; the operation of wind, rain and frost had

disintegrated the rock, the gold had been swept down by the rains into the streams and was easily recovered from the sand by the miner. When those deposits had been exhausted, methods of extracting the gold from the original rock had to be devised, and it was found to be a difficult problem. But the problem has been solved with considerable success, and today many low-grade ores formerly thought worthless are being worked with profit.

Science has had a somewhat similar history. Aristotle was one of the "original Forty-niners." In his day the observant and keen-witted Greek race had accumulated a good deal of knowledge, but this knowledge had never been formulated and systematized. This was the task to which Aristotle in effect addressed himself, and he performed it on the whole very well. The result was an encyclopedia of the knowledge possessed by the Greeks of his age, enriched by the results of Aristotle's own researches.

But Aristotle had exhausted the mine and his successors were unable by the use of his method to extract any new facts of importance. Their attempts at defining and redefining, classifying and reclassifying, resulted only too often in nothing but futile hair-splitting.

Moreover, his method was fatally mistaken in more than one vital point. His "first principles" roughly correspond to what we call "laws of nature." But he had only two criteria for determining the truth of such laws, self-evidence, and observation. The first is simply the feeling of certainty which they inspired in him when he contemplated them. But that is no criterion. Aristotle was no more exempt from the illusions of his age than was any other man, and repeatedly accepts as self-evident principles which we know to be absurdly false. Observation was his second criterion, but it also was most untrustworthy. For example, Aristotle believed that if observation established any fact whatever it established the facts that earth and water tend to move toward the center of the universe, and that heavier bodies fall faster than lighter ones. To revert to

the parable, he had no means of distinguishing gold from pyrites, of ascertaining the purity of his gold or of refining away its impurities.

Thus Aristotle's method resulted in incorporating into his philosophical system not only the entire body of knowledge possessed by his age, but also a very large part, perhaps the greater part, of the popular errors of his age. The fact that a large part of the popular superstitions are eliminated is to be credited, not to the merits of Aristotle's method, but to his own critical and sceptical temperament which prompted him to reject the worst extremes of superstition current in his time.

Before science could make real progress a more accurate method of observing the phenomena of nature had to be devised, just as the gold-mining industry had to wait for the results of the analytical chemist. Little by little the labors of successive generations brought such a method to perfection, namely, that of experimentation, which essentially consists in analyzing the masses of phenomena given by observation into their significant factors. Aristotle was not wholly ignorant of experimental methods; he uses them occasionally, and the later Greek scientists, notably Strato of Lampsacus, who occupied Aristotle's chair at the Lyceum some forty years after his death, employed them to a considerable extent. But neither Aristotle nor any of his successors in the least appreciated their importance. The short cut to riches which Aristotle used so successfully fascinated men's imaginations and diverted their attention from the only path which could lead to real success.

Try to imagine how this aspect of Aristotle's philosophy would impress the men of the thirteenth century. They were suddenly presented with a system of philosophy most imposing with its array of sweeping general principles rigorously applied to all aspects of nature, and yet, on the whole, not subverting but confirming and justifying the ordinary beliefs of men. What wonder is it that criticism was silenced? And when, in addition to this, philosophers found themselves in possession of the very method which Aristotle had himself used, what wonder is it

that they were fired with emulation to complete his work, to extend knowledge to its furthest bounds, to organize the whole into a perfectly articulated system and to exhibit its harmony with the system of revealed religion which had been unknown to Aristotle? This was the aim of the great scholastics—of Albert, Thomas Aquinas, Bonaventure, Duns Scotus—a noble aim, worthy of those noble men. But they failed; and we, looking back from the vantage of more than six centuries, can see in part why they failed. They were under the spell of Aristotle.

But we of the twentieth century, of course, are not under the spell of Aristotle. Yet we should be wary in our boasting. There are fashions in thinking no less than in attire, and they are sometimes quite as despotic. In the eighteenth century, England was fascinated by Locke, Germany by Leibnitz and Wolff; in the nineteenth, the Mills, Bentham and Spencer ruled in England, Kant, Fichte, Schelling and Hegel in Germany. America, so far as she is susceptible to such influences, has hitherto followed England and Germany, but a few years ago a native American philosophy, Pragmatism, bade fair to become the shibboleth whereby every man's philosophic orthodoxy was to be determined.

From such a mass movement of thought, the "spirit of the age" as it is often called, not one of us can wholly dissociate himself. We too are atoms in the mass and must to some extent move with its movement. But we can at least be conscious atoms. We can strive to distinguish the ideas and prejudices which we breathe in from the environment from those which are based upon evidence tested by all the means in our power. And in the cultivation of this spirit of independence, of free criticism, lies our only hope of ultimately drawing nearer to that Knowledge the attainment of which was the dream of Plato and of Aristotle, of Albert and of Thomas, of Descartes, Spinoza, Locke, Kant, Hegel, Spencer, James—of all the aspiring souls among all nations and throughout all the ages.

IN THE LAND OF PELOPS

By H. L. Crosby

Assistant Professor of Greek, University of Pennsylvania

For fear that the title chosen for this lecture may have occasioned misconceptions as to the subject matter to be treated, it may be well at the outset to state that no attempt will be made to set forth a new and startling theory as to what was the real and original land of Pelops nor to narrate a tale of domestic infelicity to account for his leaving home. The name of the ancient hero early fastened itself upon the land of his adoption, the southern half of the Greek peninsula, and in so remarkable a fashion that, although no distinctive name developed for northern Greece, the whole district south of the Corinthian Gulf was called the Peloponnese, or Pelops' Island.

What a host of fascinating memories, partly myth and partly history, is awakened by that name! Poet and artist never tired of describing how at Olympia Pelops defeated Oenomaus in the chariot race and became the first of countless Olympic victors. Hippodamia, who was his prize, became the mother of the heroes that gave their names to Troezen and Epidaurus. From the same stock came also the noble Atridae, Menelaus and Agamemnon, lords of "hollow Lacedaemon" and "golden Mycenae." Tiryns and Argos, Hermione, Corinth, Cleonae, Sicyon, "sandy Pylus," Tegea, Mantinea, all famous in history, besides innumerable other settlements only less famous, belonged in Pelops' land and followed the leadership of Pelops' son, Agamemnon. Such a wealth of material as is suggested by these names cannot be compressed within the limits of an hour's talk. Let us content ourselves for the present with visiting but one among the many interesting sections of the land of Pelops and revive, if we can, some of the memories of its past.

Whoever knows anything at all of the history of Greece is

familiar with the names of Athens and Sparta. Of the two, Sparta seems to have been the earlier and long continued to be the stronger power. Now their relative importance is reversed. To Athens we owe the bulk of Greek literature; Sparta left almost none. Athens lies near the sea, is a flourishing city with comfortable hotels and other modern luxuries, and is besides accessible from the west by means of an excellent railroad, so that even the Cook's tourist, in spite of his relentless haste, now and then snatches a few hours off to "do" Athens en route to Venice and the Lido. Sparta has as yet no railroad and is far from the sea in whatever direction, so that the ease-loving traveler is not tempted to make its acquaintance. All the more reason then why we should make the undertaking. Perhaps the spice of adventure will offset the hardships of the way.

The morning train from Athens reaches Argos about noon. That statement will prove sufficiently definite, for in a land where time is not reckoned at a premium, railroad schedules should not be accepted too seriously. Leaving behind immortal Mycenae and Tiryns and affording but a fleeting glimpse of lovely Nauplia across the bay, its whiteness enhanced by the wondrous blue of the intervening waters, the train turns westward to begin the steep and tortuous ascent of the mountains that bound Argolis and Laconia. Just how tortuous the track really is cannot be appreciated by one who merely consults the map. Each instant the engine seems bent on dashing itself to pieces on a wall of rock ahead, but at the critical moment a twist in the road discloses a narrow opening where there had seemed no outlet before. Up and up we go, as is abundantly betokened by the puffing of the engine and the slackened speed. Twenty miles out of Argos a halt is made at the village of Acladocampos for the purpose of taking on an extra locomotive, for in the next nine miles an ascent of considerably more than a thousand feet is to be made. At this point the track begins to form a huge S, the first loop of which winds high above as lovely a valley as one would wish to see. Just before making the final turn, the railroad crosses a trestle two hundred and

thirty feet high, whence a last magnificent view is obtained of the happy valley, while around the bend still higher rise the billowy masses of the mountains of Arcadia. It was on these rugged slopes that Pan, that comical yet fear-compelling god, appeared with promise of success at Marathon to the Athenian runner Pheidippides as he sped to summon Spartan aid. One's admiration for the swift-limbed Greek grows as one views the rugged country he traversed. Finally the road begins to descend somewhat and the train emerges from the mountains into a wide plain such as one may not expect to see in mountainous Arcadia.

On this table-land the season is a bit backward and in mid-June the harvest is just beginning. The waving grain sprinkled with a profusion of most gorgeous poppies is a picture to delight the soul of an artist, however willing the sordid husbandman might be to forego the radiance of those persistent blossoms. Agriculture is still in its primitive stage. The sickle has not yet given place to the McCormick reaper, and the threshing floor, which some of us perhaps have read of in the Bible, performs its task in just the same old way.

Presently the train comes to a stop at Tripolis, a modern town whose name commemorates the fact that it is the offspring of the three ancient towns of Mantinea, Tegea and Pallantium. It is one of the most important settlements in the Peloponnese, having a population of more than ten thousand. Here the traveler bound for Sparta must bid good-bye to the railroad, which continues west and south to Kalamata, while Laconia lies directly south.

The trip to Sparta is not a thing to be taken lightly as an episode in a pleasant afternoon. It means thirty-nine miles of very hard going up hill and down dale. The best time that one can expect to make by carriage is nine hours, and that does not allow for a detour to view the site of ancient Tegea. I had been told that the diligence, which left at night in summer, took twelve hours. It was now three o'clock in the afternoon and the wisest plan seemed to be either to wait at Tripolis until

morning and go by carriage or to secure places on the diligence and make a night of it, for although accommodations on the way may be obtained at the khan of Vourlia, about three hours from Sparta, one experiences a certain not unwarranted reluctance to test the hospitality of such rustic quarters. The ancient Greek traveler, to insure his slumbers against hostile incursions, felt it advisable to take his own supply of bedding with him, and conditions have not altered much, at least in country districts.

But to our great surprise, around the corner of the station we came upon a handsome motor-bus already filling with passengers. The prospect of a speedy arrival at Sparta left little room for indecision. As we went whirling away from the town, followed by a huge luggage van that kicked up great clouds of dust, in spite of the knowledge that the trip was being shortened greatly, there came some feeling of resentment at the desecration of that wonderful road, hallowed by the memory of Leonidas and his immortal three hundred, who trudged this way so long ago to meet their death at Thermopylae. The resentment may have been unreasoning, but it was none the less human—such a feeling of righteous indignation as is aroused at the thought of railroads in the Holy Land.

If the traveler is not pressed for time, it is well worth his while to choose some slower means of locomotion, affording more leisure to observe the people along the way. He will welcome the shade of an umbrella, and the ladies of his company will hardly protest at his coatless appearance. Gathering and breaking rock may not appear to be a suitable occupation for the members of the gentler sex, but at all events it is highly serviceable, and the women by their happy faces seem to show that they are not worrying greatly over the mighty problem of the "New Freedom." Even the brushwood girl, plodding bowed over beneath her load, seems to find some joy in life and not to envy her more fortunate sister who rides.

The chauffeur took the "new road" leading due south to Sparta. Apparently to judge from his speed, his chief concern

was to arrive on schedule time; consequently Tegea, despite its interest to the archæologist, was passed by on the left. Ere long the plain was left behind and the car began to climb. The mountain road is wonderfully smooth and hard, but there is little more than space for one vehicle at a time, and the rate at which we took the curves was little short of terrifying. What if the brakes should fail to work or the turn ahead should hide an approaching wagon or a flock of goats! It was idle to speculate, though the precipice at our feet looked threatening. My fellow passengers, who were Greeks, with true Spartan fortitude seemed to ignore the perils of the way, and their example ere long had its effect.

At the top of a long ascent, we halted near the khan of Bakouros, sixteen miles from Tripolis. It is a sort of half-way station on the road to Sparta, and one can understand why a driver should wish to rest his horses after their long climb, while he himself sought liquid refreshment and a moment's cooling shade within the khan, but for one traveling by motor-bus the reasons for a halt seem less compelling. Long usage, no doubt, had sanctified the custom. Ere I had persuaded my cramped limbs to join those passengers that had already alighted, the automobile began to glide backward, almost imperceptibly at first but steadily gaining in momentum until, now thoroughly aroused, I rushed for the door. The car seemed doomed to be dashed over the precipitous cliff, but just as I gained the opening, there came a jar and a sudden stop. A wall not over a foot high had saved me from certain death. Leaping to the ground, I beheld the cause of the threatened disaster. A slender lad, whose native Greek curiosity had got the better of his judgment, was now weeping by the roadside. He had learned what brakes were made for. The old Greek poet spoke a true word when he said, "Understanding comes by suffering."

The sun was very hot, though with no accompanying depression, and the cool interior of the khan was most comforting. It was a primitive establishment indeed. The floor was of trodden earth. To the right of the door was set a long table

of loose boards supported by boxes and serving as a bar. In the rear of the room reposed a huge cask. Light was admitted only through the open door. I was invited by one of my fellow travelers to join in a glass of rezzinato. Finding the wine most refreshing, in spite of the resin, I ordered fresh glasses for the three or four who were in the room, but when I came to pay, to my surprise the score had already been settled by one of the number who modestly refused to reveal his identity.

In antiquity certainly Spartans were not famous for their hospitality. They may have suffered in contrast with the open-door policy of Athens, and perhaps too from the fact that few of the Athenians, to whom we are indebted for the bulk of literary documents, seemed to understand or appreciate them. We are told that no class of foreign residents developed at Sparta; but Sparta has never been a commercial or industrial center—it is too far to the markets of the world. Nature gave the fertile valley for agriculture, and there were people enough to work the soil—too many, in fact, for we are told that the Spartans felt it necessary to wage periodic war upon the serfs to check their growing numbers. Besides, Sparta's experience with foreign visitors had not been such as to enhance their popularity. How Paris rewarded his noble-hearted host is familiar to every schoolboy—or used to be. Yet Homer paints a pleasing picture of the hospitality later shown to the son of Odysseus by that same host. Either the soul of Menelaus was too great to be embittered by one act of treachery or else flirtatious Helen's years at Troy had made of her a sadder and a wiser woman. In a later day, that second Paris, the Athenian Alcibiades, if we can believe the tale, found it advisable to move his residence from Sparta after a brief sojourn at the royal palace. But old scores have been wiped out today, and in Sparta as everywhere else in Greece the visitor receives a hearty welcome, doubly hearty if he be an American, for the modern Greek openly claims America as his own. He who is acquainted with the mercenary ways of many other European peoples in relation to all visitors must view with suspicion the many

kindly attentions with which he meets in Greece. How surprising it is to discover that such show of friendliness springs from no ulterior motive.

But we have enjoyed the shade of the khan long enough, and although there has been no indecent haste—there never is in that land—we must resume our trip. Presently the long range of Taygetus becomes visible for the first time on the right, majestic and austere. The car has been threading its way among fairly lofty hills for most of the distance, but, once seen, this magnificent rocky barrier could never be confused with anything else. One realizes that at last he is entering Laconia. Unfortunately, the westerly sun prevented picture taking.

Beyond the pass of Klisoura, which forms the watershed between the winding stream that hitherto has paralleled the road and the celebrated Eurotas, the path begins to drop away and on the left appears the range of Parnon. But Parnon, though itself no mean mountain, suffers by comparison with Taygetus. One's eyes keep ever to the right and strain to get a first glimpse of the town that should nestle at its foot. A brief halt is made at the khan of Vourlia, whence at last a clear view is obtained of the Laconian plain with the red roofs of New Sparta in the distance. Mistra also is visible, perched high up on a spur of Taygetus.

The valley was well named "hollow Lacedaemon." Shut in as it is on north and east and west by high mountains and with treacherous headlands to the south, what wonder that its inhabitants should have lived to themselves, heedless for the most part of the stirrings from without! He who has once visited the place can understand their rejection of the call for help from their brethren of Asia Minor, their failure to lend aid at Marathon and their characteristic inertia with regard to the outside world in general. The wonder is that they should have shown such energy at last at Plataea. There seemed little reason why they should be interested in the Persian war. They owed nothing to the northern Greek and asked nothing in return. Nature seemed to assure their safety against invasion. One

may well believe the story told by Herodotus of the difficulty with which Themistocles forced them to fight at Salamis. Their chief peril was to be found at home in the rebellious hearts of their subject Helots. This was what forced them to devote their entire energy to army life and dwarfed the budding culture of the earlier days.

It was not yet six o'clock, but as the car sped on its way downward, one could see that the whole valley had taken on the dusk of evening as the sun sank behind the lofty ridge of Taygetus, although the upper air was still bright with sunlight. A sweet odor was wafted upward from the lowlands as we plunged down toward the oleanders that fringe the Eurotas, and through the stillness came faintly the music of distant bells. At last, rumbling over the new iron bridge to the northeast of the town, we rushed through olive groves to a sudden, breathless halt at the edge of the public square.

On the way I had made the acquaintance of a tall Greek with fierce mustachios, a veritable brigand in appearance, though he claimed to be the owner of a farm near Newark, N. J. When told that after a brief visit at Sparta my plan was to push westward through Taygetus, he seemed incredulous and insisted that at any rate I should agree to be his guest for a few days while he showed me the sights of the valley. I had hoped that he had forgotten his invitation, for I did not wish to offend him by repeated refusal and my plans could not be altered. But no sooner had we dismounted than he inquired for my luggage. Fortunately he found a rival in the host of the Hotel des Etrangers, who pushed his claims so vigorously that at last he carried us off in triumph.

The public square of Sparta in the early morning hours presents a busy spectacle. There, as in all southern countries, the marketing is carried on in the open. Fruits and vegetables are spread out in most appetizing profusion. Young porkers lying with feet hobbled, no doubt with a painful premonition of the toothsome sausage that is to be their future state, squeal to high heaven in protest. Yonder a man, whose face would

seem to have been cured in the smoke of his charcoal fire, is carefully tending long spits on which are broiling entrails, an ancient dish and appetizing no doubt, though I did not sample it. Best of all are the oranges, great golden fruit more luscious and juicy than any I had ever tasted. They grow best at Sparta. Are they not the "golden apples" one hears of so much in Greek mythology? Heracles brought the parent stock from the Gardens of the Hesperides—a pleasant labor surely, even apart from the trick he played on stupid Atlas. It is easy to believe that it was from Helen's own country that Eris got the golden apple—gallantry forbids the suggestion that it may have been a lemon—that was to prove so fateful for Paris and his Trojan kinsmen. Whoever has tasted the Spartan orange can suggest an added reason for Aphrodite's pride in that trophy. Its seeds planted in her favorite garden at Paphos provided the fruit that was to cause fleet Atalanta to lose her race. Well might she pause in her running to gather up those golden globes so cooling to the throat. We purchased a few for immediate consumption. The price was ridiculously low, and we wanted to secure a larger stock to carry with us on our further journeying, but we had nothing in which to carry them. The Spartans, male and female, instead of a market basket employ a great flat bag suitable to swing from the saddle bow. Paper sacks are here a thing unknown. Examination of the shops about the square revealed some bags for sale, but none so glorious in color and weave as some we had seen in actual use. As we were debating what was best to do, a little old woman carrying a bag of wonderful attractiveness darted within a shop. Not proof against such temptation, we followed her and asked if she would sell. The bag was already bulging with strings of garlic and other Greek delicacies, and our offer was wholly unexpected. But alas! everything in this materialistic age has its price, and once she had recovered from the shock, she began to dicker in true Greek fashion. The lust of the contest sparkled in her fine old eyes. At last she named a figure. We offered about half, whereat in great disdain and

pity she elevated chin and eyes, that mute sign, descended from pre-Homeric days, with which great Zeus himself conveyed refusal. The meaning would be unmistakable even to one who knew no Greek. In due course we strode away, but took pains to walk slowly back again past the shop. A furtive glance within showed that the bag was now emptied and neatly folded. A soft touch on the arm assured us that its owner had seized the bait, and soon the deal was closed to the satisfaction of us all.

The Sparta of today, like so many other settlements in Greece, is distinctly modern. Unlike the ancient town, it occupies a relatively small area and is composed of substantial buildings set fairly close together, with good streets intersecting each other at right angles. The principal street runs east and west. Fronting its eastern limit is seen Mt. Parnon, yet so far away across the level valley that its height appears much less than is the case. The red-tiled roofs of the houses form a striking contrast with the dazzling white below. Here and there a towel suspended before a street door proclaims the barber shop within, a more rational and natural emblem, one would think, than the ubiquitous striped pole of our own countrymen. Many of the better shops are fronted by arcades, a most wise provision of the tradesman in that land of perpetual sunshine, and the modern representative of the old-time stoas or porticoes that enclosed the market-place in Sparta as in Athens. Here, when the shadows begin to lengthen, like some mushroom growth suddenly there appears a forest of little round tables fringed about with chairs. The populace is not slow to accept the omen, and soon the nimble waiters are in constant demand to provide the delicious sirupy coffee or wine or beer. Whoever has an errand to go at such a time will make better speed if he follows the common practice and takes to the open road. Herodotus, in detailing the particulars in which the Eygptians differed from the Greeks, records that they ate in the streets. He says nothing of where they did their drinking. Would he have been surprised at the modern Spartan? It seems an

excellent custom from the standpoint of morals, for a man is hardly likely to exceed the golden mean in public and surrounded by his family.

As one looks westward along the main street, the houses seem to skirt the very base of Taygetus, in reality three or four miles distant. On the left and facing the training field of the Spartan youth is seen the classic outline of the Museum, the repository of many quaint and interesting relics of the past. Farther westward, conspicuous among the neighboring buildings, rises the imposing cathedral.

Of the ancient town practically nothing remains. Thus is amply vindicated the well-known dictum of the historian, who in the time of Sparta's greatest glory declared: "Suppose the city of Sparta to be deserted, and nothing left but the temples and the ground plan, distant ages would be very unwilling to believe that the power of the Lacedaemonians was at all equal to their fame. And yet they own two-fifths of the Peloponnesus, and are acknowledged leaders of the whole, as well as of numerous allies in the rest of Hellas. But their city is not built continuously, and has no splendid temples or other edifices; it rather resembles a group of villages like the ancient towns of Hellas, and would therefore make a poor show. Whereas, if the same fate befell the Athenians, the ruins of Athens would strike the eye, and we should infer their power to have been twice as great as it really is."

The British School at Athens during the years 1906–10 conducted a campaign of excavation at Sparta, the valuable results of which are to be found in their annual reports for the period and supplement the earlier efforts of our own American School. Much of what has been found, however, dates from Roman times or later, and though interesting in itself, does not link us with the glorious days when the city was in its prime.

Just north of the modern settlement the visitor comes upon the so-called tomb of Leonidas. It is an impressive structure of massive blocks, and one wishes that he might be sure that it once guarded the bones of that mighty warrior and martyr

who made Thermopylae synonymous with freedom; but cold science assures us that it is in the wrong spot to permit any such identification. But if not Leonidas, then surely some other great man lay buried here, for there was no dearth of heroes.

Farther on rises the hill called the acropolis—not an acropolis in the ordinary usage of the word, at least in the days of the city's greatness, for it was her proud boast that she needed no walls of defence other than the ranks of her stalwart sons. On the southwestern slope lie the remains of a large theater, probably of late date, for the drama was hardly at home in that warlike atmosphere in the early days. The site, however, early served as a place from which to view the dancing and athletic contests of the festival called the Gymnopaediae, and Herodotus speaks of a theatron in that connection. Somewhere in this neighborhood once lay the market-place, and from it led the famous street named Apheta from the fact that here the suitors started on their race for the hand of Penelope. Her modest conduct later as wife of Odysseus, the winner of that race, may possibly have caused some to overlook the fact that she was cousin to the dashing Helen and, like her, bred in Sparta. Beauty must have been a family trait in that house, and in Sparta at any rate the cynical statement made by G. B. Shaw, that it is the female of the species that does the courting, seems not to hold good. Even in later days the Spartan lover literally captivated his bride-to-be.

From the summit of the hill above the theater one gets a magnificent panoramic view of the entire Spartan plain. From the northwest flows the broad Eurotas, passing within about five hundred yards of the hill on which we stand. From its marshy shores the Spartan lad once gathered the rushes that formed his humble soldier's bed. The stream is shallow enough in summer, but heavy rains and the melting snows from the hills might easily send it over the almost non-existent banks. Beyond the river stretches the range of Parnon, on whose steep slopes, somewhat southeast of modern Sparta,

once lay the palace of Menelaus, whose splendor caused the sons of old Nestor and Odysseus to gape in wonder. Now no trace remains. Southward we see New Sparta, whose southern limit is formed by the Magoula, one of the multitude of streams that are fed by the snows of Taygetus to swell the Eurotas. On the west frowns the range of Taygetus itself, snow-clad throughout most of the year, the dominating note in the landscape. In all directions the plain is dotted with groves of orange and lemon, mulberry and olive trees. Here where we stand, in the midst of grain and trees, are a few blocks from the foundations of the little temple of Athena of the Brazen House. In this ancient shrine, the most famous of any in the locality to the Greeks of other states, the Spartan general, Pausanias, took refuge when detected in a treasonous plot with the Persians. Not daring to snatch the suppliant from the sanctuary, his countrymen removed the roof and blocked up the door, thus leaving the unhappy wretch to die of hunger and exposure. His bones, in obedience to the commands of Apollo, were interred before the shrine, doubtless that his restless soul might enjoy the beautiful landscape denied his dying gaze.

At the eastern end of the hill are the disappointing remains of two other structures. In the neighborhood are to be found here and there, like ancient sentinels, portions of Roman fortification walls of brick. Farther eastward, on the bank of the Eurotas, there have been unearthed the foundations of the ancient sanctuary of Artemis Orthia, that cruel goddess, said by her worshipers to have come from the barbarian north, in whose service Spartan lads submitted to be flogged to exhaustion, perhaps sometimes to death, in a test of endurance. A Roman theater, of which little now remains but the circular outline of the foundation stones, faced the entrance of the temple and the altar where the flogging was administered. No doubt it often witnessed this strange ritual, if it was not erected for that express purpose. Great quantities of votive offerings of early date discovered on this site, mute yet eloquent witnesses

to the popularity of the goddess and her cult, are to be seen in the local museum.

But as Thucydides bears witness, and he was in a position to know, Sparta in the fifth century before Christ was not famous for its architectural achievements. Pausanias, the Baedeker of ancient Greece, visiting the spot six centuries later, found a multitude of statues, altars, graves and shrines, some of the latter dignified by the name of temple, but the scant notice that he accords them in general is some indication of their slight importance as works of art. The men and myths whose memory they preserved monopolize his pages. The city's greatness lay in her men, and the physical features of their environment that did so much to mould their character were such as need not the skill of the archæologist to uncover and interpret, but are visible to the eye of every sympathetic visitor in mountain, plain and rushing torrent. It is indeed a commonplace that the ancients in general were indifferent to the beauties and the grandeur of nature. Like all commonplaces, it doubtless has much of falsehood in it. The truer explanation of their customary silence in regard to such matters would be that what was a part of their everyday life and in the power of all to see needed no song of praise. The average native of the coast of Maine does not burst forth in rapture at the wonderful sunsets, the purple haze on the hills of Mt. Desert, the majestic rocky shores, the varying moods of the sea; but were he transplanted to some Kansas farm, no doubt he would long for home. Only four poets are associated with Sparta's history, and unfortunately the few fragments of their verse that we possess are all too scant to serve as an index of what they may have sung.

But the Spartan was not content with his own proper valley. Early in his history by two pitiless wars he gained possession of the fertile land of Messenia lying to the westward across the mountains. Just why this came about is hard to understand and harder still when one has traversed the pass by which the armies doubtless marched. Though a warlike people from the

start and forced to a military life, they seem never seriously to have entertained imperialistic ambitions with this one exception. Surely they had no special fear of the Messenians. The mountain barrier would appear to be a sufficient guarantee of safety from that quarter. It must have been a plain case of land-grabbing occasioned by pressure of population. We are said to have a striking parallel in our own day.

Having engaged an agoyat and his two mules, we set out about three o'clock on a hot afternoon to seek the famous Langada, or gorge, of the Magoula that forms the main line of communication with this land of Messenia. Some three thousand years ago the youthful Telemachus in company with Nestor's son followed this route in search of his prodigal father, "the much-enduring, godlike Odysseus." They were going in the opposite direction from ourselves, yet how they ever got through with a chariot must remain a mystery. The gorge is the rival of the more famous Vale of Tempe for ruggedness, and is much longer. Homer disposes of the exploit lightly in six verses, hardly stating more than that they mounted the chariot, plied the lash, the horses flew, and the journey was ended. One might think that the poet were reporting a telegram of the two young adventurers. Though much may be forgiven the rapidity of the epic narrative, one has strong suspicions that the worthy bard had never made the trip himself; otherwise he surely would have been more inclined to boast of the achievement. But it was not an era of scientific accuracy. No board of unsympathetic specialists threatened an investigation of the amateur geographer or demanded proofs, and his chief concern was to get the hero to his journey's end.

In case there should be any misconception as to the joys of travel on muleback, a view of some of the faithful little beasts and their equipment may serve to set the subject in its true light. The ancient Greeks, we are told, did not use saddles except in the case of women, effeminate men or cripples. One would think that the rule might better have been made all-inclusive, for we behold rather an instrument of torture than an

aid to comfort. Even with a rug spread over it, much is left to be desired, and the most comfortable position is not astride. The victim is perched high above the beast, so that to mount or dismount requires no small degree of agility. The absence of a pommel does not add to one's feeling of security, particularly when lurching violently down a steep declivity with a precipice at one's elbow and treacherous rocks strewn underfoot. Fortunately, only superhuman efforts could induce the mule to hasten his deliberate pace. For some distance the way leads over a beautiful level road bordered by olive and mulberry trees. In the fields by the side of the road peasants in the quaint garb still familiar in rural Greece are plowing in the good old-fashioned way with patient oxen dragging the primitive wooden plow. Taygetus is seen dimly from the first, screened somewhat by the orchards through which we pass. Crossing a small bridge that spans one of the many streams that irrigate the plain, one obtains a clearer view of the snow-clad range, an imposing sight, well calculated to impress the approaching traveler with some notion of the magnitude of his undertaking. Ere long directly ahead looms the hill on whose steep sides cling the decaying houses of medieval Mistra, once the metropolis of the district. Though the summit is over two thousand feet in height, the hill is dwarfed by the greater altitude of the main range immediately behind.

Mistra is well worth a careful inspection. Not only its picturesque situation, the buildings jutting out from the bare steeps row on row and at the top the once formidable Franco-Turkish stronghold, but the architecture and the mural decorations of the churches are of unique interest. Especially attractive is the church of the Pantanassa, or Queen of Queens, and the old monastery adjoining, now the possession of sweet-faced nuns with high-pitched voices. Thither we made our way on foot, sending our agoyat and the mules around the base of the hill to meet us at the farther edge of the village. Our guide, a lad of sixteen, came in response to the summons of a kindly priest of patriarchal aspect whom we found seated in the shade

near an old well, engrossed in fingering a string of large black beads, not a rosary but the national plaything of all male Greeks. With what rapt attention they listen hour after hour to the impact of bead on bead! Though doubtless an unprofitable occupation, it is at least less destructive and untidy than the Yankee practice of whittling, and "Satan," we are told, "finds work for idle hands to do."

With considerable difficulty we followed our guide, for the path is extremely steep and paved with stones worn smooth and slippery by the passing feet of countless generations. On the way to the more imposing Pantanassa, one visits the quaint Peribleptos church nestling beneath a shoulder of the hill. Having reached the Pantanassa after several minutes more of hard climbing in the hot sun, after the guide had testified to our spotless character and pious intentions, a service rendered seemingly with no compunctions, the key grated in the lock of the outer gate and we were face to face with two of the sisterhood, who led us first of all to a scrupulously clean waiting room from whose deepset windows may be obtained a glorious view of the Eurotas valley and the hills that hedge it on the north.

After the long climb in the heat of the afternoon, the cool interior was most welcome. But the nuns, who had left us as soon as we were seated, were slow to return, and we proceeded to inspect the room. In one corner was a little shrine. On the walls were several cheap pictures dealing with religious themes, such as one might expect to find in such a place, but in their midst, most glorious of all, a large chromo of the Lusitania. Could it have been a votive offering for a safe voyage? At last the patter of feet on the stone path outside announced the approach of our gentle hostesses. One of the pair bore a tray on which were glasses of water and of masticha, a native liquor, and two small cups of most delicious coffee. Not until we had successfully undergone these initiatory rites were we allowed to proceed with our visit. The church itself proved most interesting. In the subdued light, the frescoes were but dimly visible, but the enthusiastic explanations of the pious

sisters helped us to decipher the meaning of the sacred scenes and emblems. From the lovely cloister of the monastery was secured a fine outlook upon the valley below. Higher up the hill one passes a much dilapidated palace. On the very summit are found the not inconsiderable remains of the citadel itself in a fair state of preservation.

After a hard scramble we rejoined our agoyat, mounted the mules, and, picking our way carefully along the base of the hill, left Mistra behind, moving northward in search of the entrance to the Langada. It proved not so easy to find as one might wish. It soon became plain that our host at Sparta had not secured for us one of the usual guides. It was the height of the harvest, and he had to take what he could get. So we kept plunging on through a perfect labyrinth of trails in the midst of fields and orchards, and getting a good foretaste of the rough riding in store for us on the morrow. There was nothing to be done but follow our leader, but darkness was not far distant and an ignominious retreat to Sparta seemed inevitable before we at last struck the right trail. It led high up the mountain side above a wonderfully fertile valley. Presently the red roofs and white walls of the village of Trypi appeared in the distance at the entrance to the gorge. We halted for the night at the Grand Hotel—an imposing name indeed for a caravansary that seemed to boast but one room for guests, but a name that seems to have fastened itself upon innkeepers everywhere in that country.

In spite of the liquid refreshment afforded at Mistra, the ride had parched our throats, and having heard of a fine spring near the edge of the village, we hastened, cup in hand, to slake our thirst before the evening meal. A small iron pipe by the roadside from which poured a tiny stream was mistaken for the spring, but some good-natured natives, their natural courtesy forbidding indulgence in laughter at our ignorance, directed us onward. We were appalled at the magnitude of our error when the real spring was found. It is finer even than the more famous Castalian fount, for all of its poetic associations. The cold,

clear water issues copiously from under an overhanging rock and falls from four or five stone spouts into a limpid pool beneath, whose overflow pours across the road and tumbles in a riot of foam down the mountain. Unfortunately the gathering darkness and the constant shadows of the grotto itself made photography impossible. One who has never experienced enforced abstinence from water from fear of fever germs cannot appreciate the joy of such a debauch as ours. Our dry bodies behaved like sponges, and it was only by the exercise of rare strength of character that we tore ourselves away.

After a most delicious meal, we were guided about the little plot of ground attached to the hotel. It could not have been more than a quarter-acre at the most and was all steep hillside, but it supported a profusion of trees—olive, plum, orange, lemon, fig, cherry and English walnut, besides hazel and pomegranate bushes, grapevines, potatoes, tomatoes and beans. Nor were the beehives forgotten. What a model of intensive horticulture!

Our bedroom was wonderfully clean and airy, being in the nature of a sun-parlor, with three sides all glass. As it overhung the valley, there was a magnificent outlook. The late moon just rising over Parnon flooded the place with mellow light and made it difficult to decide to shut out the scene and go to sleep; but we were to rise early for a long, hard day, and the monotone of the mule-bells beneath our window soon cast its spell upon our eyelids.

Despite the early hour of our departure, high up on the mountain where we were, the sun's rays were already strong enough to make a picture. Our priestly looking agoyat appears hardly in a gracious mood. We were soon to regret more than on the day before that we had not attended to the selection of our man ourselves. An unwilling guide is worse than none at all. The man in fustanella is the sturdy proprietor of the Grand Hotel, the first word of which title is visible above his head. One would scarcely imagine that the handsome youth by his side is the youngest son of a large family. Life in the mountains surely must be a potent charm against old age.

Shortly after leaving Trypi, the traveler must make his way on foot for some distance, for the trail grows difficult and dangerous. Even such sure-footed beasts as these mountain mules might slip on the loose stones, and a spill would prove disastrous. One is glad, however, of the opportunity to use his camera at will, for the entrance to the pass is most imposing, and it is not the easiest thing imaginable to practice photography from the back of a grazing mule. The experiment was tried several times that morning, for it is not a simple thing to dismount and regain one's seat when a huge hold-all strapped to the saddle makes it imperative to reverse the ordinary procedure of equestrians and throw one's leg over the head of the mule. Far below the path flows the mountain stream, slender indeed in summer and almost hidden by the trees that mark its course. Above, the rocky slopes are almost bare of verdure, and the prevailing yellow, splotched here and there with red or green, gleams brightly in the wonderfully clear atmosphere. But, there are flowers, myriads of them. Too insignificant to make a showing against the rock when seen from a distance, on a nearer approach their bright faces make one forget the otherwise desolate austerity of the scene. Over fifty varieties had been noted before fatigue and noonday heat confused the count.

The trail is of a most varied character, now up, now down, frequently proceeding by zigzags, retreating a hundred yards or more to reach a slightly higher level, only to descend later to the very bed of the torrent to gain the other side. This continual repetition of painful struggle to gain a height which is no sooner reached than the path descends again, is dreadfully wearing to the nerves and body of the poor tenderfoot. It all seems so unreasoning, especially after one's legs are one mass of bruises from the crazy saddle and the spinal column seems about to collapse. The few short stretches of fairly level going are therefore duly prized. In the rainy months of winter the trip is beset with added difficulties and much of the distance has to be made on foot. Considerable has been done in recent years

to better conditions—here and there retaining walls or a bit of tunneling save a hard detour—yet even so, there is plenty to test the endurance of the tourist. Loose stones lie everywhere, and for much of the way large jagged rocks protrude upward from the path, so that the patient mule is forever twisting in and out in the endeavor to find a place to plant his dainty foot. This performance is doubly interesting when making a descent, especially in case at the same time a jutting rock forces your beast to step perilously near the verge. Then indeed one has need of a clear head. Sometimes in making a sharp turn, the mule's hind quarters seem suspended directly over the abyss. For a long while it was a source of wonderment to me to observe with what perversity the beast always chose the outer edge. No amount of moral—or immoral—suasion could make him abandon his strange tactics. He seemed to take a diabolical delight in seeing how close he could come without falling off, whereas my fervent desire was for "safety first." The mystery was solved when I met a string of pack animals laden with brushwood. I should have snapped their picture, had I not at that moment been very much occupied with more vital matters.

Some three hours out from Trypi, the gorge widens considerably and the hillside becomes less precipitous and forbidding. On the left, across the valley, is a considerable growth of pine trees, while on the right the trail zigzags upward over terraced country, with here and there a khan. Your muleteer will doubtless drop behind at one or more of these social centers to pass the time of day over a glass of wine, selfishly allowing the mules and their burdens to plod along, for a steep bypath enables him to join you later on, just as you are chuckling over having given him the slip.

Another hour of steady climbing brings the divide into view, four thousand two hundred and fifty feet above the sea. Far away to the south, rising nearly four thousand feet higher still, looms Mt. St. Elias, the loftiest peak of the central range. It is easy to see in the name of this Christian saint that of his

pagan predecessor Helius, the sun god, whose claim to the mountain tops we should hardly question. It is but one of many instances of the easy transition from pagan usage to that of the Christian church.

Surmounting the summit of the pass, the trail leads steadily downward in a general southerly direction, yielding a brief view of the Gulf of Kalamata and, farther west, the waters that wash "sandy Pylus," the home of the venerable Nestor. Toward noon, if one has wisely made an early start, Lada with its olive groves and pretty vineyards comes in sight. As we approached, repeated firing was heard in the direction we were taking. The sound was not reassuring, though we had been told that brigandage was no longer regarded as in good taste and had accordingly been given up in the best families. At length arrived in the village itself, we were comforted by the announcement that a wedding was the occasion of the fusillade. Whatever the origin and purpose of the demonstration, surely such an exhibition of the militant spirit would hardly augur well for a happy wedded life.

The khan at which we stopped to eat the lunch we had brought with us seemed more like a robber's den than a place of entertainment, but the welcome was none the less genuine. The son of the shaggy proprietor of the place, a gilded youth whose Broadway clothes contrasted strangely with his pomponed Turkish shoes, was delighted to recognize in us his fellow countrymen—and to air his knowledge of our language. Our first greetings over, he inquired if we knew Charlie Murphy and seemed much pained that we bore no message from that mighty chief. Our friend turned out to be an East Side florist, and an Irish wife was left behind to keep shop while he went home to fight the Turk.

As the traveler starts onward from Lada, he is greeted everywhere with keen interest. Even the women, whose fingers seem never to rest from spinning or knitting, vouchsafe a friendly reply to one's "kale 'meras" and a bright smile, compounded no doubt of unaffected friendliness and of amusement at the

foolish "Lordi" who choose to travel such a rocky road in the heat of noonday. One gathers the impression that visitors from the outside world must be rare in their district.

Beyond the town the road descends into a well-watered valley only to climb once more higher and higher on the other side until at last Lada, seen for a moment in retrospect, is finally lost to view. The path now grows somewhat wider but is still strewn with rocks, and the dizzy height would cause the head to swim, if one's senses were not deadened by the experiences of the morning. Toward the middle of the afternoon one rounds a spur and descends to the village of Chanaki from which are visible the fertile plain of Messenia and the sea. The grandeur of the pass has been left behind, and one begins to chafe at the weariness of the way and the relentless rays of the sun. But Kalamata is still far distant and there is no hurrying along the rock-strewn trail. At last, not far from the outskirts of the town, the hills give place to sandy bottom, and in a burst of recklessness the jaded traveler urges his no less jaded mule into a brief gallop that lands him at his journey's end.

SOME FAMOUS CRIMINAL TRIALS AT THE CLOSE OF THE MIDDLE AGES

By Arthur C. Howland

Professor of Medieval History, University of Pennsylvania

The administration of justice in criminal matters is frequently taken as a criterion for determining the stage of civilization of a people at any given epoch, and it probably serves as well as any other for that purpose. The question of the method to be pursued in protecting the individual or the state against the violence or the chicanery of the unsocial elements in society is one capable of a great variety of answers and by these answers we can determine the conceptions of justice, the value placed upon the individual and the theory of the state that obtain in any given society.

Under the Roman Empire the state was all-important and the individual counted only as an insignificant atom in a great organism whose interests were superior to any individual's rights. Consequently, we find a criminal jurisprudence organized without regard to the dignity or interests of the accused, but intended to secure to the state the power of controlling completely all actions the state might consider prejudicial—unlimited legislative power, an arbitrary judge, deciding on his own responsibility all questions of law and fact and the use of torture to secure information needed by the court to arrive at its conclusions.

The Germanic conception that came in conflict with this in the sixth and seventh centuries was that of a primitive people with a very feeble idea of the state, but an extraordinarily high regard for the independence and dignity of the individual. As the theory of the state scarcely existed among them, society could with difficulty be conceived as being injured by the acts of an individual and so took little part in the punishment

of crime. It was the right and the duty of each man to protect his own life and interests and to avenge with his own arm any injury he might suffer. Private vengeance and the blood feuds to which this led could not be tolerated, however, when Europe began to settle down again after the Germanic migrations into a semblance of social order, but it took many centuries before the Roman idea of the absolute state with arbitrary powers of investigating and punishing crime again became acceptable to Europe.

Instead of that a compromise was effected through the intermediation of Christianity, which has served in so many different ways as a bridge between the ancient and the modern world. If the medieval man refused to submit his actions to the judgment of a court composed of men subject to the same self-interests, prejudices and fallibility as himself, he could be persuaded that it was no derogation of his dignity to submit to the judgment of God, whose chief attribute was justice and whose omniscience was a guarantee against the errors of human judges. Hence the universal practice which obtained through all the earlier Middle Ages of an appeal to Divinity in all doubtful criminal cases.

The accused, as the one chiefly endangered once the crime had been committed and its consequences become irrevocable, was usually given the privilege of propounding the question of his guilt or innocence to the Lord. With a certain illogicality not recognized apparently by the men of the time, the form of this question varied in accordance with the degree of suspicion aroused by the circumstances of the case. If it were slight, the accused had the privilege of obtaining witnesses who joined him in an oath of innocence and ran the risk of punishment in the next world, if not in this, in case they had thus perjured themselves. If there were stronger suspicions against the accused, however, he was compelled to seek the judgment of God in a more dangerous fashion by the ordeal of hot water or hot iron, cold water or fire, where God's attention to the case was insisted upon by making it necessary for Him to interfere

with a special act of providence in order to indicate the innocence of the accused. In the ordeal of the hot iron, for instance, the man must seize a piece of red-hot metal and throw it a certain distance. His hand was then wrapped in bandages and at the end of three days examined, when the absence of suppurating blisters indicated his innocence, but their presence was a proof of guilt.

Such a method of trial was a frank confession of the inability of the court to deal with conflicting testimony and its unwillingness to decide between contradictory assertions of the contending parties. It might seem that the system was calculated to secure the conviction of every man who thus undertook the ordeal, were it not proved by convincing records that the number of acquittals under this system at least equaled the number of convictions. This circumstance, taken in conjunction with the fact that notorious evildoers were as likely to escape conviction as men of good reputation, gradually undermined men's confidence in the ordeals even where they were unable or unwilling to substitute other methods of trial. Thus we find Henry II of England, in the twelfth century, ordering his judges to send all accused criminals to the ordeal. If they failed to pass through it successfully they were, of course, to be promptly hanged; yet even if the judgment of God declared in their favor they were, nevertheless, to be exiled from the kingdom for life in case they were men of evil reputation. This sceptical attitude toward the ordeals was confirmed by the Church itself, when in 1215 Pope Innocent III forbade the clergy to take any part in such trials by pronouncing benedictions or rites of consecration over the hot iron or the hot or cold water. This action of God's representative on earth finally destroyed the bases on which men's confidence in the ordeals rested.

There was, however, another method of appealing to the judgment of God which had an even stronger hold upon the minds of the upper classes, and that was the judicial duel. In an age of faith it seemed to the professional fighting class that the God of Battles must inevitably strengthen the hand

of the righteous and weaken the arm of the wicked. Therefore single combat was the natural method of settling their controversies and an accusation of crime was likely to be accompanied by the offer of the accuser to prove it on the body of his opponent, the refusal of the accused to accept this arbitrament being taken as a confession of guilt. Yet here, too, the rationalistic spirit of the later Middle Ages finally perceived that the results were not necessarily in accord with justice and that the guilty might escape his just dues and the innocent be punished.

The chronicler Froissart relates an incident of his own time which shows not only the unsatisfactory nature of the judicial duel, but also the difficulty the men of the fourteenth century found in trying criminal cases by the modern rules of evidence. "About 1387," he says, "there was much conversation in Paris respecting a duel which was to be fought for life or death at Paris. It had been thus ordered by the Parliament of Paris, where the cause, which had lasted a year, had been tried between a squire called James le Gris and John de Carogne, both of them of the household of the Count d'Alençon and esteemed by him, but more particularly James le Gris, whom he loved above all others, and placed his whole confidence in him. As this duel made so great a noise, many from distant parts, on hearing of it, came to Paris to be spectators. I will relate the cause as I was then informed:

"It chanced that Sir John de Carogne took it into his head he would gain glory if he took a voyage to the Holy Land, having long had an inclination to go thither. He took leave of his lord, the Count d'Alençon, and his wife, who was than a young and handsome lady, and left her in his castle called Argenteil, on the borders of Perche, and began his journey toward the seaside. The lady remained with her household, living in the most decent manner. Now it happened that the devil, by divers and perverse temptations, entered the body of James le Gris, and induced him to commit a crime for which he afterwards paid. He cast his thoughts on the lady of Sir John de Carogne, whom he knew to be residing at the castle of

Argenteil. One day, therefore, he set out, mounted on the finest horse of the Count, and arrived full gallop at the lady's castle, where he was kindly received.

"Taking advantage of the hospitality freely offered, he committed a heinous assault upon the lady, and returned with great speed to the Count d'Alençon, reaching there at nine o'clock in the worning. He had been careful to show himself to the Count's attendants before leaving and appeared at once in the Count's presence on his return to establish evidence of his innocence. The Lady of Carogne, though in great grief and distress, concealed the crime from all her attendants, and it was only upon her husband's return from the Holy Land that she revealed the circumstances to him. In great wrath and distress, the knight brought the matter before the court of the Count d'Alençon and demanded justice.

"The examination and pleadings were carried on at great length. James le Gris boldly denied the charge, declared it was false, and wondered much how he could have incurred such mortal hatred from the lady. He proved by the household of the Count that he had been seen in the castle at four o'clock in the morning; the Count himself had seen him in his own bed-chamber at nine o'clock, and said that it was quite impossible for anyone to have ridden three-and-twenty leagues and back again, and do what he was charged with, in four hours and a half. The Count told the lady he would support his squire, and that she must have dreamed it. He commanded that henceforth all should be buried in oblivion. The knight, being a man of courage, and believing what his wife had told him, would not submit to this, but went to Paris and appealed to the Parliament. It summoned James le Gris, who replied, and gave pledges to obey whatever judgment the Parliament should give. The cause lasted upwards of a year, and they could not any way compromise it, for the knight was positive of the fact, from his wife's information, and declared that since it was now so public, he would pursue it until death. . . . The Parliament at last, because they could not produce other evidence than the

lady herself against James le Gris, judged it should be decided in the tilt-yard, by a duel for life or death. The knight, the squire, and the lady were instantly put under arrest until the day of this mortal combat, which, by order of Parliament, was fixed for the ensuing Monday, in the year 1387; at which time the King of France and his barons were a Sluys, intending to invade England.

"The King, on hearing of this duel, declared he would be present at it, and postponed his expedition against the English. . . . When he returned to Paris, lists were made for the champions in the place of St. Catherine, behind the Temple; and the lords erected scaffolds on one side, the better to see the sight. The crowd of people was wonderful. The two champions entered the lists armed at all points, and each was seated in a chair opposite the other; the Count de St. Pol directed Sir John de Carogne, and the retainers of the Count d'Alençon, James le Gris. On the knight entering the field, he went to his lady, who was covered with black, and seated on a chair, and said: 'Lady, from your accusation, and in your quarrsel, am I thu adventuring my life to combat James le Gris; you know whether my cause be loyal and true.' 'My lord,' she replied, 'it is so; and you may fight securely, for your cause is good.'

"The lady remained seated, making fervent prayers to God and the Virgin, entreating humbly, that through her grace and intercession, she might gain the victory, according to her right. Her affliction was great, for her life depended on the event; and, should her husband lose the victory, she would have been burnt and he would have been hanged. I am ignorant, for I never had any conversation with her or the knight, whether she had not frequently repented of having pushed matters so far as to place herself and husband in such peril; but it was now too late, and she must abide the event. The two champions were then advanced and placed opposite to each other. When they mounted their horses they made a handsome appearance, for they were both expert men at arms. They ran their first course without hurt to either. After the

tilting, they dismounted, and made ready to continue the fight. They behaved with courage, but Sir John de Carogne was, at the first onset, wounded in the thigh, which alarmed all his friends. Notwithstanding this, he fought so desperately that he struck down his adversary, and, thrusting his sword through the body, caused his instant death. When he demanded of the spectators if he had done his duty, they replied that he had. The body of James le Gris was delivered to the hangman, who dragged it to Montfaucon and there hanged it. Sir John de Carogne approached the King, and fell on his knees; the King made him rise, and ordered one thousand francs to be paid him that very day; he also retained him of his household, with a pension of two hundred livres a year, which he received as long as he lived. Sir John, after thanking the King and his lords, went to his lady and kissed her; they went together to make their offering in the church of Notre Dame, and then returned to their home."

The sequel to these events, of which Froissart appears to have been ignorant, demonstrated that the confidence of the king and country in the arbitrament of the duel was entirely misplaced. Le Gris was really innocent of the crime imputed to him, as was proved later by the deathbed confession of the real offender, and the miserable Lady of Carogne, overwhelmed with remorse at having thus been the cause of death of an innocent man, ended her days in a convent.

The custom of appealing to the judgment of God to determine the truth in criminal matters gradually died out, not so much because of the unsatisfactory nature of the results obtained as because society was acquiring a stronger organization toward the close of the Middle Ages and the state was arising on the ruins of feudalism to take upon itself the responsibility of seeing that justice was done. Crime was beginning to appear as an injury to society at large rather than to the individual alone and the government official begins to take the place of the private accuser in its detection and punishment. The uncertain results of ordeals and duels were ill adapted to the needs of

official investigation of crime and the Roman Law was therefore called upon to furnish the methods of procedure—inquiry by the professional judge, the testimony of sworn witnesses and finally the torture of both principal and witnesses to arrive at the truth.

In this transformation the Church led the way. It had acquired a strongly centralized organization long before the state. Its criminal jurisdiction covered many fields, now considered secular; and consequently it was first to feel the need of more certain methods of criminal jurisprudence. These new methods, adapted with changes from the Roman Law, were known as the inquisitorial procedure and their adoption was due to Innocent III. At first they had nothing in particular to do with heresy, but were intended to discover and punish the misconduct of the clergy. The Church was honeycombed with abuses of various kinds at that time and the only road to reform seemed to lie in the speedy detection and punishment of the offenders. For this purpose the inquisitorial method was devised, whose chief characteristic is seen in the arbitrary authority given to the judge to proceed on his own initiative in the investigation of crime—to summon the accused before him and require him to answer all questions under oath; to examine any witnesses he might choose; and in short to employ all possible means of arriving at the truth. The court was thus made both prosecutor and judge at the same time and the only safeguard to the interests of the accused lay in the conscience of the judge. Not that all means of defense were taken away. The accused was allowed to tell his own story. He could employ counsel and call witnesses for the defense. The charges against him were made known when he was summoned before the court; but it lay wholly within the discretion of the judge whether he should be allowed to see a copy of the evidence given by the witnesses and usually only their names were communicated to him without any indication of what each one had testified. When, a generation after Innocent's time, heresy came to occupy the chief attention of the Inquisi-

tion, torture was introduced into the procedure, and it can be seen that conviction was then inevitable if the judge were convinced in his own mind of the prisoner's guilt.

The secular authorities were quick to seize the advantage afforded by this new machinery of criminal procedure and it was not long before the inquisitorial methods were adopted in the secular courts of the continent.

One advantage, however, remained at all times with the courts of the Church. Sorcery, magic and all crimes involving supernatural manifestations came especially under her jurisdiction. With the remarkable development of satanic activities in the later Middle Ages few important crimes were likely to be committed without the devil's hand appearing visibly at some stage of the proceedings, with the result that the Church courts could, if it were thought desirable, take cognizance of many things otherwise justiciable in the secular courts. Most of the famous criminal trials that have come down to us are naturally the prosecution of powerful men, whose downfall would involve many important interests. It was necessary to marshal all possible influences against them and the most efficacious weapon was the universal horror and terror of satanic practices. Hence we find the Church courts being constantly employed in the great criminal cases of the day. Whenever an ecclesiastic was involved in criminal charges the principle of benefit of clergy also comes in, for they could be tried only in a Church court.

A case that attracted a great deal of attention at the beginning of the fourteenth century was the trial of Guichard, Bishop of Troyes, for murder, sorcery, embezzlement, arson, forgery, riot, usury, bribery, counterfeiting and various other crimes. Owing to the position of the accused the case was necessarily tried in a Church court, but the real prosecutor was the King of France, Philip the Fair; and when he prosecuted, few complained that the indictment was not sufficiently inclusive. The court followed the inquisitorial method and it is interesting to note what evidence could be procured against a great Church dignitary by this form of procedure.

To begin at the beginning, the bishop was the son of a *neton*, that is, of a demon, who had for some years preceding his birth infested his mother's house. Public rumor in the neighborhood had always attested this fact and the bishop himself was accustomed to boast of it, saying that *netons* were well known to be partial to ladies with beautiful hair and that his mother was famous for her lovely tresses. These facts were sworn to by twenty-seven witnesses. The demon father had evidently kept in close association with Guichard in later life. After he had entered the Church and risen to be prior of a monastery, one of the monks one day saw his head suddenly surrounded by a fiery ring of glowing coals that burned without flame, and was much terrified by the sight.

Throughout his career Guichard had had, according to the testimony of many witnesses, the services of a private devil whom he kept with him, sometimes in the wardrobe of his chamber, sometimes carrying it about with him in the peak of his hood or for convenience sake in a little glass vial. He was frequently heard to converse with this demon and get its advice. We have the sworn testimony of a certain kind-hearted sorceress named Margueronne that she was summoned to the bishop's chamber one day to consult with him and a Jacobin friar, his friend, as to how the bishop could make his peace with the queen. Being unable to help him in the matter, she retired to the farther end of the room and the two men began to consult over the problem, when suddenly Margueronne saw a form like that of a black monk descending through the air from a window near the ceiling to the side of the Jacobin. This figure wore horns on his forehead and the sorceress rather thought it was the devil himself, an idea confirmed by the conversation which followed: "You make me tired," said the devil, addressing the friar. "What do you want?" (Que me veux-tu, toi qui me fatigues ainsi?) "It's the bishop here who wants you," replied the Jacobin. "Well, what does he want?" asked the devil impatiently. "He wants you to make his peace with the queen." "If he wishes me to do that," said the demon, "he

must make me a present of one of his limbs." "I will take that proposition under advisement," spoke up the bishop, and there the interesting scene ended as the devil flew out through the window and Margueronne speedily followed through the door after having accepted a small gratuity from his reverence.

The real object of the prosecution of the Bishop of Troyes, however, was to prove that he had caused the death of two queens, the dowager Queen of Navarre and her daughter, the wife of King Philip the Fair. Both of these ladies had been engaged in a bitter controversy with the prelate over his alleged embezzlement of funds which they had entrusted to his care. They both died suddenly, as it happened in each case at an opportune time for the bishop, and the purpose of the testimony so far introduced was to show the peculiar advantages he enjoyed to secure diabolical assistance in encompassng their death.

A swarm of witnesses swore to the various circumstances connected with the death of the dowager Queen of Navarre. Guichard was known to be in communication with an Italian apothecary in Paris and was more than suspected of having employed him to poison the queen. The apothecary had been seen one night pounding up two diamonds with a hammer and mixing them with clotted blood and a certain saffron-colored powder. On being questioned he had given the absurd reply that he was preparing this expensive mixture to cure one of the queen's falcons of lice. The Italian did in fact deliver the preparation to a member of the queen's household, but he was an Englishman, one of a detested race, and a few days later the queen died under circumstances that aroused the gravest suspicions of her physician. The bishop's joy on receipt of the news was unrestrained and he was heard to declare that he was rid of an enemy.

The death of the Queen of France was accomplished in a different manner, for Guichard was too shrewd to employ the same methods twice. This time we learn of his machinations at first hand from the confession of a hermit who lived in the forest not far from Aix and in whose lonely cell the murder was

really though not visibly perpetrated. His story is confirmed by the confessions of several others who took part in the crime.

At the hermit's cell there arrived one night the Bishop of Troyes, accompanied by his familiar, the Jacobin friar. They were soon joined by our friend the sorceress, and sitting down before the fire the friar produced a quantity of white wax from beneath his robe and after heating it proceeded to mould it into the figure of a woman. This image was a foot long, but slimmer than it should have been, the thrifty friar claiming that two and a half livres' worth of wax was as much as they could afford for the purpose. Then sending out for a midwife from a neighboring village they consecrated a vessel of water and with all the solemnity of the full Church service baptized the waxen figure under the name of the Queen of France, the bishop and the hermit acting as the godfathers and the sorceress and the midwife as godmothers.

After the ceremony the figure was placed before the fire and having been somewhat softened the sorceress pierced it through the head many times with a needle, repeating—

> "She for whom this thing was made
> This week shall in her grave be laid."
> (Celle pour qui ceci est fait
> Cette semaine n'aura pas sa tête.)

After this the party broke up; but later, on three separate occasions, the sorceress returned to repeat the incantation, the last time accompanied by the bishop and the friar. They appeared much chagrined at the continued good health of the queen and finally seized the waxen image, crushed it beneath their feet and threw the fragments into the fire. Three days later the queen was dead.

Guichard's rancor, however, was not appeased by the death of these two enemies. He sought also the lives of the king's eldest son and of his brother, Charles of Anjou, and prepared a powerful poison against the time of need. To prevent the knowledge of this deadly drug being lost to the world, it may be

well to set down the recipe for its preparation, as given by the hermit who saw it concocted in his cell: Take one live snake, two toads, two scorpions and two spiders. Crush the toads and place in a suitable dish. Add the scorpions and spiders and the head and tail of the snake and place upon the fire, slowly pouring in a little water. Allow to simmer until the contents of the dish thickens to the consistency of wine-dregs. Then spread on a plate covered with a piece of cloth and stand in a cool place for one month. Gloves should be worn to avoid touching with the hands, as the poison is very penetrating and the smallest quantity is fatal. It was tried on a dog, which died within twenty-four hours, and on a servitor of the Count of Anjou, who lived but three days, though circumstances prevented its being administered to the intended victims.

To these more heinous crimes of the Bishop of Troyes the testimony presented to the court added a few small murders, such as the poisoning of the prior at Saint-Ayoul, the starving to death of two men in the episcopal dungeons, the hanging of a trespasser without trial, and the assassination of three or four other persons who had incurred his displeasure. The various other points in the original indictment were likewise attested by a large number of witnesses.

Inasmuch as the charges involved so high a dignitary of the Church, the trial had been conducted before a special papal commission composed of an archbishop and two bishops, with final decision reserved to the Pope. More than two hundred witnesses were examined, but, in accordance with the inquisitorial methods of procedure, the accused was not allowed to see a copy of their depositions and his close imprisonment still further interfered with the defense. The episcopal commission was evidently desirous of convicting Guichard, but when the case finally came before the Pope the latter compromised the matter. He did not pass definitely upon the evidence presented, but transferred the accused to another diocese, Diakovar, in wild and distant Bosnia, at the very confines of Catholic Christendom. The government of France, having at any rate

rid the country of the king's enemy, let the case drop at that point.

The partial failure of the inquisitorial procedure against a bishop of the Church is to be explained by the reluctance of the Pope to pass definitely on the evidence furnished in such abundance to the commission of bishops who had conducted the proceedings. No such restrictions, however, hampered the proceedings directed a century later against one of the most powerful nobles of Brittany, Gilles de Rais, Marshal of France. This great baron had distinguished himself in the Hundred Years War by brilliant feats of arms and especially as the companion and champion of Jeanne d'Arc, of whose personal bodyguard he was one of the commanders at the relief of Orléans. For this and other services he had been created marshal when only 25 years of age. After the death of the Maid of Orléans he gradually withdrew from public life to reappear some ten years later as the greatest monster known in the annals of crime. In fact, so great an impression was made on the imagination of the times by the misdeeds for which he was condemned that he has become a prominent figure in the folklore of northern France and is there identified as the original Blue Beard of fable. His castle is still pointed out by Breton peasants as the haunt of that renowned monster.

The Blue Beard of tradition was, however, in sober fact, a young and wealthy noble, the most powerful and influential of the baronage of Brittany, and one of the leaders and patrons of the early French Renaissance. He sought to draw into his service learned men from various quarters. He collected illuminated manuscripts. To satisfy his love of music and of splendor he founded a collegiate chapel at his estate of Machécoul, in which was installed a chapter of some thirty canons and a great choir of boys. He spared no expense in providing the most elaborate fittings and artistic decorations for his chapel and he sought far and wide for beautiful voices for his choir, whose possessors he did not hesitate to entice into his service by rich gifts and pensions. He was accustomed to take

with him on his journeys not only a large retinue of troops, but also his entire chapter of canons and his boy choir, and even had a portable organ constructed that he might not lack an elaborate musical service wherever he went. Moreover, he was lavish in alms, bestowing immense sums in charity on all suitable occasions to the poor who flocked to the gates of his castles.

No suspicion of crime seems to have attached to Gilles de Rais until political considerations caused the Duke of Brittany to determine on his ruin. He possessed lands and castles of extreme strategic importance, located on the borders of Brittany and commanding the approaches to that duchy. The rivalry of the duke and the King of France was bitter at this time and the family of de Rais were closely connected with the royal court. The extravagant expenditures of the baron compelled him to pledge a number of his castles to the Duke of Brittany for ready money, but when his family procured an order from the king forbidding any further alienations, the duke felt that the time had come to take measures for the permanent occupation of all the baron's strongholds. The ease with which evidence could be procured by inquisitorial methods naturally suggested as the best means to this end a prosecution of the owner for crimes which would entail the confiscation of all his property.

Such a prosecution, however, was not likely to be undertaken by the secular power alone, for the baronage of Brittany were traditionally jealous of ducal authority and more than likely to resent a legal attack on one of their own number. The intervention of the Church alone could protect the duke against their fears and the career of Gilles had fortunately already made him amenable to its jurisdiction. He had recently committed sacrilege by attacking a church and seizing an enemy of his who was hearing mass there; moreover, his financial necessities had led him to employ the services of an Italian alchemist named Prélati, who had been engaged for some time in experiments for the discovery of the philosopher's stone and the transmutation of baser metals into gold. Such studies

brought Gilles under the suspicion of sorcery, for they were seldom prosecuted at this period except with the aid of magic, and this was condemned by the Church as heresy.

Thus the conditions already existed for calling in the aid of the Church in an attack on the baron, and the duke found a ready instrument in his chancellor and chief adviser, the Bishop of Nantes, a relative of the ducal house and himself a purchaser of some of de Rais' estates. In the France of that period, however, a charge of sacrilege or even of sorcery was not sufficient in itself, unaccompanied by charges of more atrocious crimes, to excite that universal horror and detestation necessary to induce the baronage to forget their corporate interests and withdraw their support from a fellow noble threatened by the prince. Most of the nobles could probably have been shown to be involved in similar acts. Proof was required of horrors and depravity that would forfeit all support or assistance to the accused.

Consequently, the first step in the prosecution was a secret visit made by the Bishop of Nantes to the various parishes of his diocese to establish the existence of a public rumor, charging Gilles with the crimes considered necessary. The result of this diocesan visit was a remarkable document setting forth that the baron was suspected and accused by many and reputable persons of having committed unnatural crimes; of having kidnapped large numbers of little children and taken them to his various castles, where after inhuman tortures, he had cruelly murdered them; of having made compacts with the devil and sacrificed children to him; of having practiced sorcery and magic and other unmentionable crimes. The fact of this secret investigation by the bishop never came to the baron's ears, though it formed the entire basis of the subsequent proceedings, and no new charges were brought forward during the course of the trial. The witnesses, who were called in great numbers later on, confined themselves merely to supplying ghastly details to the above outline.

After several weeks of preparation and investigation, the

bishop was ready to proceed to more serious steps. He issued a citation addressed to all the priests and notaries of his diocese, ordering them to summon Gilles de Rais, baron and knight, to appear before his episcopal court on a certain day, there to answer to the charges of inhumanly murdering, slaying, and killing many children, and committing other crimes too horrible to be indicated in this citation, but which, as he said, would be set forth in Latin at the proper time and place. The citation further mentioned the invocation of the demon and the offering of human sacrifices to him: together with many other enormities involving hersey to the offense of Divine Majesty and the subversion of the faith.

There is reason to believe that this citation was scattered broadcast throughout the diocese in order to excite popular execration, but it never came to the knowledge of the accused, for on the day following its issue a notary of the bishop together with an officer of the duke appeared before the castle of Machécoul and summoned its lord to present himself before the bishop's court and answer the charge of heresy, the other articles being suppressed at that time. Gilles fell into the trap thus skillfully laid, and though he might have put up a stout resistance, or fled to his powerful relations across the border, had he known the gravity of the charges, he readily consented to accompany the official to Nantes. With him were taken his servants, Henriet and Poictou, his alchemist, Prélati, and a priest named Blanchet. Two young nobles, his intimate companions for some years, had perhaps been warned of the impending blow; at least they had left the country a few days before. The servants mentioned were deemed sufficient witnesses for the prosecution, and it was an obvious danger to bring within range of the court any of the nobility who might be able to supply testimony in the baron's favor.

Arrived at Nantes, Gilles was at once thrown into prison in the New Tower and left without aid or advice to await the summons of the court.

Meanwhile, the bishop had seized and thrown into prison

an old woman known as La Meffraye, a servant of the baron's, and from her had extracted full details of her master's alleged crimes. By what means this confession was obtained we are not told, but there is little doubt that it was by torture. In any case, it was not legal evidence, for her examination did not take place in court, nor were her statements ever produced before the judges. They were, however, circulated through the city among the common people, and her vampire tale of stealing scores of children and delivering them to the Baron de Rais for torture and murder, was used to excite the fury of the mob. Curiously enough, she was never called to account nor punished for these crimes so far as our records show, though she may have fallen a victim to the mob on her release from prison.

Five days after his arrest, Gilles was brought before the Bishop and charged by the official prosecutor with the crime of heresy, but in general terms only. He denied the charges, but, thus entrapped, offered to prove his innocence either before this court or before any papal inquisitor. The purpose of his judges being thus accomplished in the acknowledgment of their jurisdiction, a ten days' adjournment was decreed.

Gilles did not appear in court at its next session, but the time was occupied in examining witnesses regarding the disappearance of children during the past few years. Only two persons could be found in addition to the seven cited in the original denunciation who would swear to the desired facts, and none of the witnesses had any knowledge of what had become of the lost children until they had been instructed by the reports of La Meffraye's confession now in circulation throughout the city.

All things being thus prepared, a new trap was sprung on the unsuspecting prisoner. It must be remembered that up to this time he had been kept in ignorance of any charges against him except the vague and general charge of heresy, and so had been induced to recognize the jurisdiction of the bishop and the Inquisition. When the court again convened, however,

the crowd was admitted to the Lower Hall of the New Tower to create a dramatic scene by demanding vengeance for their murdered children, and Gilles was summoned from his prison to the Upper Hall and there charged for the first time with child murder and other horrors, though this was done irregularly, not in writing, but by word of mouth and in Latin. Gilles caught enough of the purport of the charges, however, to recognize their nature and at once appealed from his judges and demanded that the case be transferred to another court. The appeal was denied as frivolous on the ground that it was not in writing, though he was given no opportunity to put it on paper and, moreover, was not allowed an advocate by whose advice he might have been able to anticipate the technicalities of the court's ruling.

At a later session, the prosecuting officer finally produced the written indictment of 49 articles, setting forth the charges in detail, and reciting the murder of more than 140 children. Gilles again refused to answer the charges, attacked the judges and once more appealed to a different court. When some of the worst charges were repeated to him in French, he broke out into insults, and the session closed with a second rejection of his appeal and a formal and written sentence of excommunication against him for refusing to plead.

A few days later a remarkable change had come over the prisoner, for which the records do not attempt to account. He acknowledged the jurisdiction of his judges and freely confessed to the practice of alchemy and the effort to transmute metals, but denied the invocation of demons and the other serious charges of the indictment, as to the truth of which he said he was willing to trust his case entirely and completely to the evidence of his servants and fellow prisoners, Prélati, Blanchet, Henriet, Poictou, and La Meffraye. They were thereupon brought in and sworn in his presence, but of course remanded to another room for private examination. Gilles was even offered the opportunity of drawing up a list of questions to be asked them by the judges—a very unusual privilege under the

inquisitorial procedure—but declined to do so, as he declared he could trust to their telling the full truth. He then knelt before his judges and humbly prayed for the removal of his excommunication, a prayer graciously granted by the bishop and the inquisitor, who immediately reconciled him to the Church in spite of the charge of heresy still hanging over his head.

The following days were devoted by the court to the examination of Gilles' fellow prisoners. There is every reason to believe that they were tortured. Their evidence never traveled outside the counts in the indictment, nor added anything but deatils to the public rumors mentioned in the original letter of defamation. In the case of the two servants, indeed, Henriet and Poictou, who were destined to meet the same fate as their master, the confessions agreed exactly—in some place word for word and that in regard to occurences of years before and even in the matter of figures, so that there can be little doubt that their answers were dictated.

Prélati's confession was naturally different, dealing as it did with the evocation of demons, but it is full of absurdities and impossibilities, which stamp him either as a lying charlatan or as giving the required testimony under compulsion—probably the latter, as his evidence agrees so entirely with the charges formulated by the prosecutor. The evidence of the priest Blanchet is carefully arranged to exculpate himself, and at the same time be as damaging to Gilles as possible. As a matter of fact, both he and Prélati escaped punishment entirely, though the latter according to his own confession had made an offering of the limbs of a child to his demon, Barron, and had been constant and sometimes successful in his evocations of the devil.

When Gilles appeared again in court, he was still ignorant of these confessions and refused to add anything to his previous admission of the practice of alchemy. The confessions of his alleged accomplices were then read aloud to him. If we may believe the court records, he made no protest against the evidence, but the fact that he still refused to confess anything

further would seem to show either that the records have been falsified at this point, or that Gilles did not fully comprehend the purport of the confessions, owing to their being read rapidly in Latin; for he was not given the opportunity of reading them at leisure.

Notwithstanding the satisfactory nature of the evidence now at hand, the prosecutor at once demanded that Gilles be put to the torture, "in order to elucidate the matter more fully," as he put it, and the judges after a brief consultation so decreed. The application was postponed, however, and Saturday, the second day following, was assigned for the presentation of pleas and objections on the part of the accused. But on Friday morning, without waiting the prescribed time, Gilles was suddenly summoned to the torture chamber and ordered to prepare for its immediate application. His fortitude was not proof against this sudden change of plan. Taken unprepared his resolution gave way, and he humbly begged for postponement, declaring that by the next day he would so deliberate as to satisfy them regarding the crimes with which he was charged, so that, as he put it with unconscious humor, they might not have to give themselves the trouble of torturing him. The court finding his nerve thus shaken refused to do more than grant a postponement until 2 P. M. of the same day when, if he had not confessed to at least a part of the charges, the torture should be promptly applied. They graciously permitted him, however, at his earnest request, to spend the intervening hours outside the torture chamber. At 2 o'clock Gilles made confession in general terms to all the counts in the indictment, but refused to enter into details. The following day, in the presence of a great crowd, gathered for that purpose, he repeated his confession with full details of his crimes, though these added nothing to the previous evidence of his servants. The importance placed upon exciting the anger and violence of the mob is seen in the fact that the confession, made in Latin, was repeated in the common speech, in all its details, for the benefit of the crowd.

On Tuesday, the 25th of October, Gilles was brought before the court for sentence. By the bishop and the inquisitor jointly he was condemned for heresy and the invocation of demons; and by the bishop alone sentence was passed on the charges of crimes against nature, sacrilege and the violation of ecclesiastical immunities. The punishment in each case was excommunication. What constitutes a striking irregularity, however, was that though convicted of heresy, he was not required to abjure, but was reconciled on the spot and readmitted to full communion with the Church.

Such unexampled leniency is to be accounted for only by the fact that the purpose of the prosecution was being accomplished through another agency. While the ecclesiastical judges had been conducting their investigations, the trial of part of the charges, those relating to the murder of infants, had been proceeding simultaneously in the neighboring court of the duke, which had done little by itself except to examine a large number of witnesses in regard to the mysterious disappearance of children during the past ten years. This court had, however, accepted in full faith and without further investigation the evidence presented in the Church court. Therefore, when Gilles de Rais had received his sentence and full reconciliation at the hands of the bishop and the inquisitor, he was at once led before the secular court and condemned to hanging and burning and the confiscation of all his estates to the Duke of Brittany. The next day the sentence was carried out, and with him suffered his two servants, Henriet and Poictou. No record contains mention of the punishment of the other accomplices.

These two trials, that of the Bishop of Troyes and that of Gilles de Rais, illustrate the characteristics of the inquisitorial methods of procedure. In neither case would conviction have been possible under modern conditions, yet in the former it was only prevented by the interference of the Pope to protect a high ecclesiastic, and in the latter, conviction was inevitable from the outset. Both men, it is true, *may* have been guilty

of crime, for it is impossible to prove a negative; but the methods employed absolutely forbade an impartial investigation of the truth. The Inquisition was a violent reaction against the loose and unsatisfactory procedure of an earlier age, but its undue exaggeration of the authority of the court to the destruction of all individual rights must be kept in mind as one of the dangers attendant on legal reform.

AMERICAN FOREIGN POLICY IN THE ORIENT*

By James C. Ballagh

Assistant Professor of Political Science, University of Pennsylvania

It has more than once been said that the government of the United States has created but one cardinal doctrine in foreign policy during all of its diplomatic career, namely, the so-called Monroe Doctrine, and that there is no common agreement outside of America, and perhaps in it, as to just what, at the present time, that doctrine means. Others have admitted that at most America may have evolved one other doctrine in her diplomacy, namely, the so-called "Open Door" policy with respect to China. Both of these doctrines, it has been erroneously asserted, originated in England. On the contrary, as far as the United States is concerned, they originated with her executive department as distinct American policies. Though they are doctrines of self-interest and protection, neither policy has been assumed to be purely selfish. The one policy has been conceived to look toward and protect South and Central America, the other to save a former ancient empire, and now new republic, from plundering and ultimate dismemberment by robbers, by a gentlemen's agreement between them.

At the time that Mr. Roosevelt was, as President of the United States, giving emphatic endorsement to the Monroe Doctrine as a live American policy, the German auditors of a Roosevelt professor at Berlin were being told that the United States had definitely abandoned this doctrine. And now American writers are appearing from several sides who are even disposed to snatch the laurels from the brow of Mr. John Hay and to tell us that America never really had an open door policy

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as to China or any other place, and that this so-called policy is at the present time as mythical as the seven birth-places of Homer. In this opinion, I may say, certain statesmen of Japan seem not averse to coinciding. America, with a respectable diplomatic history dating as far back as the Paris Commission of 1776, is thus left by these interpreters without having now, or ever having had (except for the brief moment under President Monroe), any foreign policy with respect either to European, or Asiatic, or American nations. Without attempting here to discuss the vitality and importance of the Monroe Doctrine as a protective principle for the interests of this country, and more especially for those of South and Central America and Mexico it becomes my task to show whether or not America has had a foreign policy with respect to the East, and if she has had one, what that policy has been and is.

Mr. Soichiro Asano, president of the Toyo Kisen Kaisha (or Oriental Steamship Company) a Japanese corporation, founded in 1886 on his own capital, and a company which is the first one in Japan to open a regular steamship line between that country and South America, has recently voiced the opinion of commercial men of Japan that "the current of civilization has been flowing to the Pacific from the Atlantic," that "the world drama of the future will be played on the Pacific," and that "the developments that we shall witness in this part of the globe in the next few decades will be far more remarkable than those that have been made in as many centuries past. About two-score years ago," he continues, "the opening of the Suez Canal revolutionized the communications of the world; but the Panama waterway, which will directly connect the two oceans, will do much more than its rival in stimulating the growth and activity of the Pacific countries. Fortunately enough, the far-sighted Americans have seen that the future of their country is chiefly involved with the Pacific. In Oriental peoples they have found their potential customers. Will," he asks, "Pacific civilization continue to develop without bloodshed?" The answer, he affirms, lies in "the conditions of

fellowship between America and Japan who are destined to play the most important rôles on the Pacific, and in whose hands lies the power to harmonize the eastern and western civilizations."

Baron Kondo, president of the Nippon Yusen Kaisha, the steamship line that, in conjunction with the Northern Pacific Railway, has had such a large part in the upbuilding of Seattle and the State of Washington, is another one of the important commercial men of Japan to preach this comity of commerce and politics between the United States and Japan, the friendship of the two peoples, and to decry war talk as "nonsense," denying that any Japanese can be found "who advocates a war with America."

And further, even within a few days past, the venerable Premier of Japan, Count Okuma, who was a Samurai (a double-sword man) when Commodore Perry opened Japan to commerce, and who has held, besides the foreign portfolio, most of the ministries in the gift of the Japanese government, and was besides the founder and leader of the Progressive Party and of its successor the National Party (the Kokuminto), an editor and founder of a Japanese monthly magazine, *Shin Nippon* (or New Japan), has declared emphatically to a representative of one of our local papers, "There never was a war party in Japan, there never was a real war sentiment in Japan, and neither exists now." And "concerning this talk of war, if you will examine into its origin, you will find that no single phase or phrase of it originated in Japan. There never has been," he continued, "a responsible agitation for war in this country. War between Japan and the United States, I mean. What there has been was an echo of agitation and war talk that began in your country. We have jingoes here just as you have jingoes in America—the sensational press took up that cry, the cry found an echo here, and the press propaganda found imitators. But it was not responsible, it was not official. . . . Our national ways and yours are the ways of peace and enlightenment and commerce and friendship and not the ways of war."

More than once has Count Okuma declared, as has Dr. Nitobe,

the first Japanese exchange professor, sent to American universities to forge another bond to hold the two peoples together, that it is Japan's mission to harmonize eastern and western civilizations in order to help bring about the unification of the world, because "Japan is and must be the natural mediator between the East and the West." Japan, in the view of these men, is the meeting place, the neutral ground, the half-way house, the melting pot of civilization, whence a new light is to shine upon the East and upon the West because Japan has assimilated the good of both regions and disgorged the evil; and from her place in the sun the Sunrise Empire can dispense benefits to all mankind.

I have quoted these declarations at length, not that you may accept them at full face value, but because they are voiced by men whose position and accomplishments in new Japan are such as to give them peculiar weight among the framers of public opinion. It is at least important that they so think, so speak; and it would seem from the expressions of other Japanese that they speak not for themselves alone.

That it is America's political and commercial policy to reciprocate to the full this peaceful, friendly development of mutual material and spiritual interests, no one who knows the mind of the average American can doubt, but the question inevitably arises: Is America, the former teacher and leader of the unprogressive and childlike East, prepared to become the pupil and the follower of this so-called western-eastern civilization transfused through the medium of adolescent Japan and brought back to American shores in the form of things spiritual as well as temporal? Will America stand and knock again at the doors of Japan, not as Perry to open them and give, but to plead for, and receive from, the Japanese concessionaire an entrée to the wealth of Cathay, in free trade and equal opportunity in China and Manchuria? Will America barter for the privilege of again bearing her wares intellectual and material to the millions beyond those doors so lately attempted to be closed to the rest of the world by the negotiations at Pekin? That we

may weigh this problem justly it is necessary to review some steps and stages which have led to the formulation of an American foreign policy in the Pacific.

In the course of our history three areas in the East have been of prime importance in conditioning the commercial growth of the United States. In the order of time they are:

1. The northern Pacific Ocean and its islands from east to west; that is, the Pacific north of the equator, and particularly that part of it near the shores of Asia.
2. The Empire of China.
3. The Empire of Japan.

For nearly a century and a third in the minds of individual Americans, and for full a century in the mind of the United States government, there has been a clearly defined consciousness that the northern Pacific was to play a part in the commercial destinies of the American nation. The comparatively rapid additions to the territory of the original thirteen states, by which we have approached this goal of the Pacific, are, when viewed without regard to the long periods of diplomacy and world politics that intervened, conditioned and determined this advance, startling enough to arouse a proud, ambitious and sensitive, but sea-locked and over-populated, neighbor with the exaggerated and distorted vision of a land-eating, trade-absorbing monster, which must be met and held in check by force. First came the leap to the Mississippi River by the northwest and southwest cessions and conquest; then roughly to the Rocky Mountains by the Louisiana Purchase of 1803, and the rounding out of the southern frontier by the Florida purchase in 1819 and the annexation of Texas in 1845; and then, with the lesson of expansion well learned and constitutional objections forgotten, the spreading out to our natural limits on the Pacific Ocean by the accessions from the treaty of 1846 with England yielding Oregon, and the treaty of 1848 with Mexico yielding all that our greatest ambitions could desire for a Pacific outlet.

The Gadsden Purchase of 1853 rounded out this acquisition

to a natural boundary on the south, and in the extreme northwest our quiet and skilful diplomacy with Russia gave us in 1867, in Alaska, an empire of natural wealth undreamed of by either power. Thus was excluded from North America all European influence but that of England.

Without offering any defense for the methods of the annexation of Texas or for the Mexican War and the land-hunger which preceded it and was part of its cause, beyond the palliation, offered by recent investigators, of the clear necessity that the United States should forestall the ambitious projects of a powerful European power, thus much in fairness may be said of American expansion; namely, that a large portion of this domain from first to last was brought under the flag without the shedding of blood. And in fact what other modern nation in such a short space of time as one hundred and thirty-four years has added so much valuable territory to the national domain by means of peaceful treaty and diplomacy as is represented by the Louisiana Purchase, the Florida Purchase, the Oregon country, the Gadsden Purchase, Alaska, and one might include that part of the Philippines which may be conceived to be worth some twenty millions of dollars paid for it? In view of the events of this day in history, it were well for this country and our eastern friends to pause and consider this fact and that in the main the policy of the "square deal" has applied in most of our ambitions.

It is significant that within three years of the founding of our government, some Americans, far-seeing men of commerce, looked to the Pacific and to China for a theater of peaceful trade. In 1784, when our own real independence was but a year old, the "Empress of China," sailing from New York, bore the American flag for the first time, and it was as it has continued to be the flag of peace and commerce, to the island of Java and the coasts of China. The "New People," as the Chinese called us, and our trade were welcomed by the natives. Two years later (1786) a ship from Salem, Massachusetts, bore the stars and stripes for the first time to ports of India, en

route to China, and in this same year merchants of the city of Philadelphia had sent the "Canton" under Captain Thomas Truxton, of later French war fame, to join with seven other ships from New York, Boston, Baltimore and Norfolk in the China trade and so dignify the position of the first American consul in the Orient, Major Samuel Shaw, "late of the Continental Artillery," sent to Canton, China, by Congress.

In 1788, even before the ratification of the Federal Constitution was known, Lord Cornwallis, the vanquished foe at Yorktown and at that time Governor-General of India, directed that the flag of the United States, borne by a Baltimore ship, the "Chesapeake," for the first time in the Ganges, should be recognized in the same manner as the flags of the most favored nation. Barry, Robert Morris and Stephen Girard upheld the honor of Philadelphia in the command, ownership and construction of "India ships" which helped to enrich this city, New York and New England towns through an Eastern and Chinese commerce. This trade still finds a monument in the "India House" at Salem, Massachusetts, and in the fortunes of many families of wealth in the New England States.

And in 1792 it was a Boston ship that discovered the country drained by the Columbia River which Jefferson, the annexer of Louisiana, sent men of his own vicinage, Lewis and Clark, to explore in 1805 and found a claim for the United States to the Oregon territory more stable than that of her rival England. From that day on, at least in this theater, the American has held to the vision of peaceful and fair trade, and nowhere in the sphere of the Pacific since 1848 has America of her own choice proposed or aimed at any advance but one of common benefit and profit to all the peoples upon the shores of that ocean.

Even the mistaken term "imperialism," hatched by the conservatives of Spanish-American War days to characterize the policy of their opponents, has entirely passed from the American political vacabulary, except occasionally in remote sections of the great continent to the south of us where the real friendship and the beneficent influence of the Monroe Doctrine

is unfortunately misunderstood on the part of some. If anyone has a lingering doubt as to present unholy ambitions on the part of the United States for territory to the south of them, or to the north of them or to the west of them, and should he refuse to give faith to declarations of President Wilson, he need only ponder on the strenuous opposition that at all times, from first to last, met any advocacy of territorial expansion or war of aggression, an opposition which acquiesced only when the necessity became clear by the logic of events and further forbearance would have ceased to be a virtue. With as much truth as Count Okuma says it of Japan it may be said of the United States that her wars have been mostly forced upon her. Left to herself, she would abide in peace.

A brief mental review of some of the processes and steps toward a realization of American interests in the Pacific may not at this point be misplaced.

The enfranchisement of our commerce by the War of 1812 was conspicuous in the East. Within five years of its close American merchant vessels in the Pacific far exceeded those existing prior to that war and by 1820 the United States trade with China was second only to that of Great Britain. It is a coincidence that the first American warship, "The Congress," sent in 1819 to the China Seas, to protect American ships from the pirates, also carried to Rio de Janeiro the Honorable John Graham, the first American minister accredited to the Portuguese government in Brazil; but our commerce with South America lagged far behind that with the Orient.

Though our trade with China was in the main in legitimate articles of commerce, such as ginseng, metals, peltries, skins, cotton and cloths in return for tea, silks, camphor, dyes and chinaware, the hands of the American in the early days of the thirties and forties were not free of the taint of the opium traffic. But this was chiefly the work of smugglers, and China owes a debt to the United States for the sending of Commodore Lawrence Kearny with a squadron composed of the historic "Constellation" and the "Boston" to put a stop to this practice,

whether on the part of Americans "or by other nations under cover of the American flag." It was the British who were making this use of our flag, and to Kearny belongs not only the credit of effectively checking this illicit traffic during the opium war but of establishing for the first time, prior to any treaty arrangements, cordial relations with the Chinese government and forcing upon it and the British representatives for the first time an open-door policy as to trade with China.

Kearny acted with the same decision, good judgment and firmness that characterized the subsequent action of another great naval diplomat, Matthew C. Perry, in Japan and his efforts met with the same success as Perry's. In April, 1842, Kearny, to obtain redress for outrages committed upon two American merchants during the previous year deliberately violated the hitherto honored sanctity of the inland waters of China, sailed up the Canton River, anchored in front of Whampoa and, disregarding the usual roundabout methods of communication, sent his demands directly to the viceroy of the two Kwang provinces, Ke, who was also the president of the Board of War, member of the Censorate and minor guardian of the heir apparent. He won from him prompt satisafction. In September Kearny learned from the British admiral at Hongkong that a treaty between China and Great Britain had just been signed, known as the Treaty of Nanking, which gave the British the island of Hongkong, twenty-one millions of dollars as a war indemnity and, most important of all, opened to British merchants five ports for British trade, residence and official communication. He secured the terms of this treaty and sent them in triplicate and by different routes, for certain safety, to Washington, and then proceeded himself as an unaccredited diplomat to pave the way for an understanding that might lead to the participation of America in equal rights and opportunities in the empire of China. This accomplishment is so important that Kearny's own words to Viceroy Ke will bear repeating in part. They are as follows:

"The address of Commodore Kearny, commander-in-chief

of a squadron of United States ships, respectfully represents that he learns with deep interest the high imperial commissioners deputed to arrange commercial affairs with the British are expected in a short time to arrive at Canton, and that a commercial treaty is to be negotiated to operate in favor of 'British merchants' exclusively.

"The undersigned is desirous that the attention of the imperial government might be called with respect to the commercial interest of the United States, and he hopes the importance of their trade will receive consideration, and their citizens, in that matter, be placed upon the same footing as the merchants of the nation most favored.

"The undersigned does not press this matter at present, but, trusting to the good and friendly understanding which exists, he submits the case and has the honor to be, your excellency's most obedient servant."

The Viceroy Ke replied, in part, as follows:

"I, the governor, have ever hitherto treated the merchants of every nation with the same kindness, Moreover, the Americans who have come to Canton have had free commerce, month after month, and year after year. These merchants have been better satisfied with their trade than any other nations; and they have been respectfully observant of the laws, is what the august emperor has clearly recognized, and I, the governor, also well know. How, then, should I not rather, on the cessation of difficulties with the English, wish to show favor to them?

"Decidedly it shall not be permitted that the American merchants shall come to have merely a dry stick," which was to say that their interests would be duly considered, and further assurance of this fact was subsequently given. Even a member of the British Commission admits the Chinese government had promised as a result of Kearny's representations that the United States should share in all trade concessions made to the English. "The throwing open the ports of China to Europe," he says, "was not, therefore, the result of our policy, but had its origin

in the anxious forethought of the Americans, lest we might stipulate for some exclusive privileges."

From that time forward through all our treaties and trade relations with China, if we except the unfortunate misunderstandings of the days of the Chinese exclusion acts and the more recent and ill-advised boycott of American goods ascribed to our sometime friend, Minister Wu, the United States has demonstrated to the East and to Europe that she claimed no exclusive privileges or unequal opportunities in her dealings with this people. That she consistently followed a policy of the "open door," frank friendship and peaceful good will as laid down in her first negotiations, has received repeated illustration in her own dealings with China up to and since the conspicuous announcement of this policy by Secretary Hay. The treaty of Wang Hiya, signed in 1844, between the United States and China, conferred almost as great benefits upon the commerce of the British Empire as upon that of the United States. It advanced the privileges granted in the treaty of Nanking in as many as sixteen particulars, among which was the broadening of the application of the international law doctrine of extraterritoriality, in the benefits of which all foreigners in China have shared. Mr. Cushing, the negotiator of this treaty, reported to the American Secretary of State that "whatever progress either government makes in opening this vast empire to the influence of foreign commerce is for the common good of each other and of all Christendom." He might have added, "for all the world, Christians and heathen," for there is not a power but has copied from, and has benefited by, the principles and precedents set by this first treaty of "Peace, Amity and Commerce" between the United States and China. In like manner Commodore Perry, ten years later, in the treaty that he induced Japan to sign at the little village of Kanagawa on the Bay of Yedo, *opened to that country* a participation in world affairs, seeking no exclusive privileges for America, but insisting in that important Article IX of the treaty that none should be granted to any other nation in which the United States might not share.

Within seven months of this time Great Britain, in four months more Russia, and in less than another year the Netherlands, reaped all the benefit that the United States could hope to enjoy from Perry's work; and all of these conventions which paved the way for trade and further intercourse followed Perry in inserting, "the most favored nation clause," which was a fundamental guarantee of the "open door."

The most visionary political writer who examines the course and history of American foreign relations would hesitate to discover in our contact with these two powers of near Asia the shadow of any territorial ambitions. Our mind has been so clearly set on two objects, the free and profitable development of the wealth and civilization of the Pacific coast and basin, and the unrestricted barter of our goods, material, intellectual and spiritual, with the millions of people that inhabit the shores and islands over against our western coasts, that no serious student at home or abroad would accuse the American government or people of anything more unholy than a war of trade rivalry in the Pacific. Our mission has been economic and educational, not political. Samoa, Hawaii and the Philippines have come to the United States, not as the deliberately worked-out political design of an ambitious, territory-hungry power, but in the main against our will and unsought except so far as we saw in them the necessary guarantees of our commerce and the means of checking a rivalry that has threatened to close against us the "open door" in the East.

It was Tyler's Secretary of State, Daniel Webster, that, copying the unofficial work of Kearny, officially laid down, in 1843, the basal principles of that American policy in the Orient that has since come to be called the "Open Door Policy." In his instructions to Caleb Cushing, our first diplomatic representative in China, Webster said:

"You will signify in decided terms and a positive manner that the government of the United States would find it impossible to remain on terms of friendship and regard with the emperor if greater privileges and commercial facilities should be

allowed to subjects of any other government than should be granted to the citizens of the United States."

How Cushing put these instructions into effect in the treaty of Wang Hiya in the following year has already been mentioned.

In 1853 Great Britain desired further trade privileges and she unselfishly proposed to the United States joint action in bringing forceful pressure to bear upon China, during an internal crisis, in order, quoting the English proposal, "to open the Chinese Empire generally to the commercial enterprise of all of the civilized nations of the world." The United States declined, and ordered its Commissioner, Marcy, to observe the settled American policy of "non-interference" in the domestic affairs of the empire and to most strictly respect our treaty stipulations.

Secretary of State Marcy, and following him Secretary Cass in 1857, insisted upon the policy of "unrestricted commercial intercourse, without desiring exclusive privileges," and Cass declined a second proposal, now from the allies, Great Britain and France, for coercing by armed force a grant of privileges from China.

The words of Cass are significant and his service toward establishing the American open door doctrine was emphasized by Secretary John Hay during the Boxer troubles in 1900 when Hay gave to our policy its most forceful expression.

Cass said: "This country does not seek to enter that empire [China] for any other purposes than those of lawful commerce, and for the protection of the lives and property of its citizens. The whole nature and policy of our government must necessarily confine our action within these limits, and deprive us of all motives either for territorial aggrandizement or the acquisition of political power in that distant region. . . . We are not a party to the existing hostilities and have no intention to interfere in their political concerns, or to gain a foothold in their country. We go there to trade. . . . The extension of commercial intercourse must be the work of individual enterprise. . . . With the domestic institutions of China we have no

political concern, and to attempt a forcible interference with them would not only be unjust in itself, but might defeat the very object desired."

This was in effect a positive and dignified protest against territorial aggrandizement, political domination, interference in domestic affairs, and the wringing of selfish special concessions for railways, telegraphs, etc., from an unwilling giver by means of intimidation or force. The words of Cass and the refusal of the United States to be an abettor of this highwayman's method have a sound so modern and reminiscent that one cannot refrain from hoping that such instructions may again find their way to our representative in China, with a warning to all those who ply this trade and trample on the treaty rights of other nations that they will be held to sure and strict accountability.

American Ministers to China, Burlingame in 1864, Williams in 1866, and George F. Seward in 1877, all opposed any policy of pretensions to "jurisdiction over persons or territory" under the cover of "concessions," or any "exclusive grants" of territory, even when easily obtainable and in fact offered to the United States.

Secretary of State Blaine, whose enlightened policy with respect to our South American relations deserved a long continuance, laid down emphatically, in 1881, the policy of American opposition to monopolistic concessions sought by European powers.

"This government," he says, "would certainly view in an unfriendly light any act of the Chinese government which precluded our people from an equal participation with the citizens or subjects of any other friendly power, in such enterprises, mutually beneficial to the interests of both countries. We would greatly regret to see China bestow upon any corporation these exclusive privilieges. I deem it but just to say that such a policy would not only be in direct opposition to her own interest, but strongly in contrast to that more liberal spirit which should animate the Chinese government in its intercourse with foreigners."

But one European power after another, both before and after this time, by war or diplomacy, extorted territorial and other concessions from the helpless empire. Great Britain secured Hongkong in 1842, Kowloon in 1860, and forced the surrender of Chinese suzerainty over Burma in 1886 and the recognition of protectorates over territory in the direction of Thibet. France advanced on the south from 1862, and refusing the good offices of the United States, offered at the request of China, forced a war in 1884 and 1885 which practically gave her Annam and Tonquin. From 1860 Russia had been advancing on the north, getting her Pacific outlet at Vladivostock and laying the basis of designs on Mongolia, Manchuria and Korea. Portugal, who owed nearly forty years' rent for the territory of Macao in 1887, received it in inalienable but permanent possession. Japan and China, in disputes over the territory of Korea, as to which neither had real and genuine rights, but only strong historic and strategic claims, came to blows in 1894 and 1895, and from this Japan emerged in the treaty of Shimonosaki, 1896, with the important Chinese island of Formosa and the Pescadores and with a sense of injustice and smarting irritation because certain powers of Europe, to their own material advantage, had restrained her from further plundering prostrate China, only to plunder her themselves.

Germany, so the story is told in China, with what truth I vouch not, secured or abetted the murder of two of her own missionaries for an excuse to seize the incomparable port and bay of Kiaochou in the province of Shantung. She proceeded to fortify this with the fortress of Tsing Tau after obtaining a semblance of title by a ninety-nine year lease of the port and a fifty kilometer zone inland. From those who lived in this German colony for many years has come the assertion that Tsing Tau was to be the base of a permanent occupation and expansion in Shantung Province. It is the conquest of this territory by Japan in the past year that has given her the opportunity for the recent demands for a grant of increased and

exclusive privileges from China, and the re-leasing for another ninety-nine years of the Japanese leased territory in Manchuria.

As the price of Russian aid toward inducing Japan to abandon her demands for the Liaotung peninsula at the close of the China-Japan War, Russia had secured railway concessions for her trans-Siberian connections across Manchuria with Vladivostock and branches to Kirin, Mukden and Port Arthur. Russia, following the lead of Germany, secured, in 1898, a twenty-five year renewable lease of a strip on the Liaotung, including Port Arthur and Talienwan. The first was to be a naval port exclusive to Russia and China.

This action forced Great Britain in her desire to maintain a balance of power in the Gulf of Pechili to quickly demand, in April of 1898, of China a like lease of "the last important naval port left to China in the north," the port of Wei-hai-Wei.

This action and the correspondence with Germany, recognizing her special interests in Shantung, show that Britain at this time had no clear sense of, or disposition to uphold, the doctrine of the open door in China. On the contrary, this action and joint acquiescence of the powers in each others' ambitions marked the establishment of the doctrine of the "sphere of influence" and exclusive privilege which negatived every essential principle of the American conception of the open door. France, in manner like the other powers, had secured in April 1898 a ninety-nine year lease of Kwang-Chou Wan on the southwest coast of China in the province of Kwangtung, thus designating this area as her sphere of influence.

All concessions for railways, mines, banks or other "commercial and industrial enterprises" in the language of Lord Salisbury, the English premier, now became "preferential advantages" and took on a political complexion, so that China was warned she could not grant special openings or privileges to other powers in the respective spheres of influence. And these spheres were to be further sanctified by China's promises of their non-alienation to other powers. Japan had demanded

and secured such a promise from China involving the whole province of Fukien, opposite Formosa, and this had thus become the "sphere" of Japan.

The foreign diplomats in China then proceeded in opposition, combination, coalition, or separately to dictate concessions as to railways, banks, etc., to the Tsungli-Yamen, or Chinese foreign office, and to summon the aid of their navies to support their demands when other means failed. It was the railway-getting age in China, and cut-throat competition between the would-be concessionaires looked to diplomatic warfare or to the partition of China, a doctrine frankly discussed in the foreign press. Britain was at this time carrying something like eighty per cent of the foreign trade of China, and Englishmen in China began to fear that territorial demands would follow railway concessions, and that the "battle of concessions" was likely to become a losing game for England in the maritime provinces. So their policy and advice to their home government warned against the demands for special and exclusive concessions.

It was at this juncture, in September, 1899, that Secretary John Hay instructed Ambassador Choate to present to the British foreign office proposals for the "open door." He called attention to the fact that the use of privileges in Chinese concessions as a weapon to exclude commercial rivals was contrary to the declared policy and traditions of Great Britain, that freedom of trade for Britain in China should mean "freedom of trade for all the world alike." English trade bodies in London at this time interpreted the "open door" to mean equal opportunity for Englishmen and others throughout all China except in the British spheres of influence where Englishmen alone have privileges, and these spheres comprised the major portion of trading China. The preservation of China's further territorial integrity was only a general policy where it favored commercial freedom and was not against the already acquired interests of the powers and British interests or their opportunity for securing favorable leases of land. It is clear from speeches in the German Reichstag in 1899 that at this time the possibility

if not the probability of the partition of China was being freely discussed in Europe, and that it was Germany's intention not to be a laggard when that time came.

The United States followed the course of these events with concern. President McKinley emphatically stated in his annual messages in 1898 that the United States was not an "indifferent spectator" of the events in China by which Europe was acquiring such control, but he still expressed the hope that discriminations against American citizens and trade might be avoided, though he specifically indicated that the United States might become an actor to protect her commerce if any "exclusive treatment" of their possessions were applied by the new occupants. In his message of 1900 he again reviewed our relations with China and boldly laid down the principles on which he rested the doctrine of the "open door." These were: 1. an equality of treatment for our foreign trade; 2. the maintenance of the integrity of the Chinese Empire and territory. And he called for the "united action of the powers" at Peking "to bring about the administrative reforms necessary to strengthen the imperial government" and to maintain "the integrity of China." In this latter respect he seems to have advanced a step beyond the policy laid down by Secretary Hay in 1898. Hay hoped that the open door policy would remove "dangerous sources of international irritation," by which he seems to have meant the indefinite rights that might be asserted in "spheres of influence or interest" which exercised "a disturbing influence" on the operations of American business men and trade in China. Hay stated explicitly to Ambassador Choate that the United States would not recognize "exclusive rights of any power within or control over any portion of the Chinese Empire" under the sphere of influence agreements and that he feared from them complications "between treaty powers which may imperil the rights insured to the United States under our treaties with China." But he nowhere appears to have denied the right of these powers to obtain, and of China to grant, such territorial leases, provided that exclusive privileges were

not therein established that were detrimental to our commercial and treaty rights.

From all that has been said it is clear that the open door policy is a commercial and not a political policy. The proposal of it in the terms of Secretary Hay's note of September 6, 1899, to England, Germany and Russia, submitted through the American ambassadors at the courts of these powers, was as follows:

"That each [power], within its respective sphere of whatever influence—

"First. Will in no way interfere with any treaty port or any vested interest within any so-called 'sphere of interest' or leased territory it may have in China.

"Second. That the Chinese treaty tariff of the time being shall apply to all merchandise landed or shipped to all such ports as are within said 'sphere of interest' (unless they be 'free ports'), no matter to what nationality it may belong, and that duties so leviable shall be collected by the Chinese government.

"Third. That it will levy no higher harbor dues on vessels of another nationality frequenting any port in such 'sphere' than shall be levied on vessels of its own nationality, and no higher railroad charges over lines built, controlled, or operated within its 'sphere' on merchandise belonging to citizens or subjects of other nationalities transported through such 'sphere' than shall be levied on similar merchandise belonging to its own nationals transported over equal distances."

What was demanded was that no discrimination against American trade should be made or sought by concessionaires in China.

Instructions to submit these same proposals to the French government informally were cabled to our Ambassador to France on November 21, 1899, and preceding this, on the 13th and 17th of November, Mr. Hay had instructed the ambassadors at Tokio and Rome respectively to ask the acceptance of the same proposals by Japan and Italy, and their aid in inducing

England, Germany and Russia, who as yet had not replied, to accede to the proposals.

Shortly after this, on the 30th of November, Great Britain, through Lord Salisbury, acceded to Mr. Hay's proposals. On December 16th France replied favorably, followed by Japan on December 26th, Russia on December 30th, Italy on January 7, 1900, and Germany on the 19th of February. Italy's acceptance alone was unconditional, those of other powers were conditioned on acceptance by all the others interested. In the case of Great Britain, Germany and Japan, Hay had proceeded with little fear of ultimate success, because of past indications that such a policy might receive support from them; but of Russia and France and Italy he was not confident, and particularly was this so as to Russia. Count Muravieff, the empire builder of Russia in the East, was not willing to promise that customs duties would not be levied outside of the free port of Dalny, but he promised that if this was the case they should be on "all foreign merchandise without distinction as to nationality." But Russia was unwilling to abandon her exclusive privileges in Manchuria and would make no promises of the collection of tariffs by the Chinese government or that the Chinese treaty tariff would apply. Nor did he promise equal railway charges and harbor dues. This exception has been made use of subsequently by Japan to the disadvantage of United States and of other powers. On the 20th of March, 1900, Mr. Hay notified the interested powers of the acceptance by all and that it was "final and definite."

Thus for the first time the American policy of equal commercial opportunities to all nations received an international sanction. The leadership thus obtained in world diplomacy in the Orient by the United States was used to further expand and state the American policy of the "open door." The situation produced from June to the middle of August, 1900, by the Boxer revolution in China led not only to the active armed participation in relief of the legationers at Peking, but to an advanced diplomatic initiative on the part of the United

States. On the 3d of July, 1900, Mr. Hay sent a circular telegram to our representatives at Berlin, Paris, London, Rome, St. Petersburg, Vienna, Brussels, Madrid, Tokio, The Hague and Lisbon, instructing that these governments should be informed that "we adhere to the policy initiated by us in 1857 of peace with the Chinese nation, of furtherance of lawful commerce, and of protection of lives and property of our citizens by all means guaranteed under extraterritorial treaty rights and by the law of nations. . . . It is of course too early to forecast the means of attaining this result; but the policy of the government of the United States is to seek a solution which may bring about permanent safety and peace to China, preserve Chinese territorial and administrative entity, protect all rights guaranteed to friendly powers by treaty and international law, and safeguard for the world the principles of equal and impartial trade with all parts of the Chinese Empire."

This telegram, President McKinley afterward stated, was acquiesced in, as it proved to reflect "the views and purposes of the other co-operating governments," and the treaty of Pekin, September 7, 1901, illustrated the first application of this new international policy. A final word said by Mr. Hay in his acceptance of similar international proposals, contained in the agreement of October 16, 1900, between England and Germany, should be repeated. He said:

"The United States have heretofore made known their adoption of both these principles. During the last year this government invited the powers interested in China to join in an expression of views and purposes in the direction of impartial trade with that country, and received satisfactory assurances to the effect from all of them. When the recent troubles were at their height, this government, on the 3d of July once more made an accouncement of its policy regarding impartial trade and the integrity of the Chinese Empire, and had the gratification of learning that all the powers held similar views. And since that time the most gratifying harmony has existed among

all the nations concerned as to the ends to be pursued and there has been little divergence of opinion as to the details of the course to be followed."

It is important to remember that American policy in the Orient has never extended to the point of contesting the sovereign rights of China or Japan as to the granting or obtaining of political or economic concessions that do not invalidate our treaty rights and those of other nations.

By the treaty of Portsmouth Japan succeeded to certain concessionary rights in respect to railways in part of Manchuria, while Russia retained her railway grants in another portion of this territory. About 1909 alleged discriminations against other than Japanese traffic over her Manchurian system led to the projection of a plan for a British and American-built road. It has been reported by the press that Secretary of State Knox, some time in December, 1909, or January, 1910, suggested a substitute for this plan, namely: "That the present railways in Manchuria be neutralized and any new line planned be financed jointly by Japan, Great Britain and the United States." It is said that Germany unqualifiedly supported this proposal, that Britain favored it until she found her ally, Japan, opposed to it, and that it did not find any more favor in Russia than in Japan. The answer was made from Japanese sources, chiefly the press, that it was more reasonable that all the railways of China should be neutralized rather than that Japan should be singled out for further punishment in denying her the full rights guaranteed by the treaty of Portsmouth. In the London *Times* of January 7, 1910, Secretary Knox is reported to have said in substance that the proposal addressed to the powers for the neutralization of Manchurian railways disclosed the end toward which American policy in the Far East has recently been directed. The American government during recent railway loan negotiations pointed out to the interested powers that the greatest danger to the policy of the "open door" in China and the development of her foreign trade arose from disagreements among the great western nations and

expressed the opinion that nothing would afford such an object lesson to China and to the world as the spectacle of four great capitalist nations—Great Britain, France, Germany and the United States—standing together for equality of opportunity.

"One of the most effective steps to this end is to secure for China the enjoyment of all political rights in Manchuria, to promote the normal development of the eastern provinces and to take the Manchurian railroads out of European politics and place them under an economic and impartial administration by vesting in China herself the ownership of the railroads. Such a policy would require the co-operation not only of China but of Russia and Japan, both of whom it would enable to shift their onerous responsibilities in connection with those railways on the shoulders of the combined powers, and would effect a complete commercial neutralization of Manchuria. Mr. Knox is gratified that the proposal has received the approval in principle of Great Britain. He thinks it ought to meet the favor of Russia. That Germany and China heartily approve, and Japan may also."

The politics of China are still essentially railway politics and it would not be surprising that if the agreement for the "open door" is seriously threatened from any side, the danger may come in regard to exclusive rights in such concessions. The policy of the present administration in the United States against the doctrine of exploitation through concessions is a safeguard, one may hope, at any rate for present tranquillity.

When one considers the manifest large-minded friendship that has characterized almost all of the dealings of the government and people of the United States with those of China and Japan and remembers the manifest gratitude and reciprocal good feeling demonstrated in the past by these powers in many acts similar to China's entrusting their first mission to the outside world to an American official, Anson Burlingame, or to Japan's erection of a monument to Matthew Calbraith Perry; when one considers, I repeat, all these and many other good offices performed on either side, it seems almost unbelievable

that such trivial incidents as the school question and the land question in California or a reasonable and legitimate restriction of immigration on either side, or the inevitable and friendly trade rivalry for a large share or even a dominance in the marts of the Pacific, or the checking of the unfair exploitation of one power by the other, should any of them or all of them destroy in a moment a sense of the serious obligation of Japan and China to America, obligations real and definite, which have been accumulating now through three score years.

It was America that more than once refused the invitation and repudiated the doctrine proposed and applied by European powers of coercion by armed force for extorting oriental concessions. From this policy it is not to be supposed that the United States will now lightly turn whether the power applying coercion be European or Asiatic. It was America alone that in generosity and square dealing remitted thousands and millions of dollars to Japan and China which had been exacted by the great powers as indemnity for wrongs suffered. It was America that preserved a genuine and sincere neutrality in two wars of Japan, the one with China and the other with Russia, when American interests in China and Manchuria were all but ruined. It was America that lent her aid and soil to Japan in mediation when that empire's strained finances were no longer able to bear the burden of the Russian War. And uncomplainingly have America and her then chief executive borne the odium of the uninformed in Japan for the unpopular treaty of Portsmouth, whose failures, if any, were inherent in her diplomacy and lack of financial power.

It is America that gave to Japan and China her primary education in the opening of schools, secular and religious, and sent, and continues to send, bands of devoted men and women who have sacrificed the ties of kin and the opportunity for gain in the land they love in order to exemplify the golden rule and prepare the youth of the Orient for a better life both here and hereafter. It would take more time than is at my disposal to rehearse and catalogue the points of helpful contact

and mutual obligation between the powers on the east and on the west of the Pacific Ocean. Fortunately, many of them are well known and carefully remembered on both sides of this water.

If one proposition stands out more clearly than any other to thinking people in America and in the Far East as purely hypothetical and requiring demonstration, it is this, that the essential interests of the United States in the Pacific are hostile to the interests of Japan and China. The whole history of this basin shows that the aggressions that have been most feared on both sides were those of the powers of Europe. There is in fact common cause and common interest between the three powers most concerned if they will only but continue to see it.

Nothing seems more unfortunate than that the stimulated imagination of certain parties in Japan, in a perfectly natural desire to protect their growing commerce and manufactures, should lead her at a fortuitous moment to commit acts of vandalism and aggression, as mistaken in judgment as in law, upon a neighbor struggling with internal problems of great magnitude and attempting to accomplish in a few years what it has taken Japan over two generations to do. The breach of China's neutrality involved in an enforcement of the Japanese demands against which China has recently justly complained to the United States and England and the treachery of Japan to her allies who committed themselves to the policy of the "open door" would in such an act constitute a breach of moral right more significant than any that has so far taken place on the continent of Europe. This is true because such action is not only without a shadow of the excuse of the doctrine "necessity knows no law," but it is in distinct contravention of Japan's declared purposes and intentions, which the present government of Japan has tried to give to the world and particularly to the United States, in answer to her legitimate inquiries, when Japan made her attack upon the German possessions in China and the Pacific. The folly of such ill-judged and unprovoked aggression for imaginary benefits, territorial or commercial, as indicated

in the reported ultimatum from Japan to China might seem to have received sufficient illustration in the gruesome and revolting events on the battlefields of contemporary Europe. Are there not enough men left in Japan with memories to the past and faces to the future to hold their country fast to the traditions of frank and upright dealing with their peaceful neighbors and of a firm friendship with that power which is now temporarily both Asiatic and North American, and those continued good will conditions the best happiness and advancement of the island empire?

In the hands of the forward-looking man on both sides of the Pacific is placed a responsibility for clear thinking, calm judgment, right action that, at the portal of this great theater of coming world history, mutual forbearance, confidence and genuine good will may raise a monument as noble as the Christ of the Andes and may inscribe above it a legend more enduring than the *Pax Romana* in the words and the reality of "*Pax Pacifica*."

I conceive that this nation of the United States has a mission in world affairs, and this mission is not one of self-aggrandizement or even of self-protection. It is a mission of altruism and of civilization in no small sense. It has given to the world its highest ideals, first of political and religious toleration, then of freedom. It has held out the hand of a friend and helper to the struggling states of South America when they came "from under the yoke" of oppression. It has condemned incompetency and tyranny in government by enfranchising and reconstructing Cuba. It is giving to the Filipino people a tutelage for a liberty they are clearly destined to obtain when they can defend it. With great forbearance under insult and suffering, and with magnanimity, it has withheld its hand from Mexico; without the need of policeman or a soldier it has maintained with a powerful but generous people on the north a common frontier some 4,000 miles in extent.

Holding aloft at its eastern portal the beacon of enlightenment and liberty, may it not stretch out from its western gateway the emblem of a still higher civilization, the palm of peace and good will to the lands of the rising sun?

DAVID RITTENHOUSE*

By Maurice J. Babb

Assistant Professor of Mathematics, University of Pennsylvania

Where you spent your childhood I do not know, but I played in the garden of Humphrey Marshall, the botanist, and the fragrance of the flowers and trees was mixed with the fragrance of old memories of a hundred years before, for was not Marshall the companion of Bartram and Franklin and Rittenhouse and all that coterie of scientists, philosophers and men of letters that made the old-time Philadelphia? Then, too, there were still many farmers about who loved astronomy for science's sake and swept the heavens in the long winter nights with their own telescopes, just as our David did and others before him in this new world where the wonders of other worlds were timed and tuned to the wonders of America. I have loved these old memories and have been proud of them in our hazy, conservative Philadelphia way. Yet recently I have wandered instead of wondered in the early broken paths and I want to show you some of the things I found.

On September 29, 1690, Samuel Carpenter, who had not yet title from William Harwood, made an agreement with William Rittenhouse, the first Mennonite bishop in America and a paper-maker of Holland, for twenty acres of land. Later, on the ninth day of the twelfth month called February, 1705–06, a deed was executed to Rittenhouse, Will Bradford, "the Caxton of our Middle States," and others of a company, and in 1692 Richard Frame sings of Pennsylvania, "A paper mill near German Town doth stand." Horatio Gates Jones writes on Rittenhouse paper of this and successive paper mills. William deeded three equal and undivided fourth parts of the original twenty acres for a term of 974 years to his son Nicholas three days after the first deed, and afterwards, dying intestate, Nicholas was

* Illustrated.

possessed of the whole. Here Matthias, the youngest son by Wilhelmina Dewees, was born, 1703, and later lived in the new house built in 1707, where his son, our David, first saw light, April 8, 1732. On May 24, 1734, Nicholas made a will and bequeathed the paper mill to his eldest son William, and about this time the second son, Henry, started farming in Worcester Township, Montgomery County, and Matthias established himself in the same manner at Norriton, twenty miles from Philadelphia.

Now, Elizabeth Williams, the mother of David Rittenhouse, was possessed of a "mind uncommonly vigorous and comprehensive, but her education was much neglected, as is too often the fate of orphan children." Even though her two younger brothers, David and Lewis, died in their minority, she remained cheerful and hopeful. As his uncle's namesake, our David inherited a chest of carpenter's tools, together "with a few elementary books treating of arithmetic and geometry, some manuscripts," and possibly a translation of the "Principia" of Newton. Though it is claimed that he reinvented the Calculus after reading this last work, none of his writing shows any trace of such knowledge. Scarcely twelve years of age, yet having four years previously built a water-wheel, this inheritance determined the bent of our young mechanic's life. His younger brother, Benjamin, frequently sent to remind him of meals, observed that not only the fences at the head of many of the furrows, but even his plow and its handles were covered over with chalked numerical figures by the fourteen-year-old dreamer. At seventeen, David made an ingenious wooden clock and soon afterwards one of metal. His somewhat reluctant father at length despaired of making him a farmer and supplied him with money to purchase immediately necessary tools for the clock-making business, and David built a small workshop by the side of the road and began his career as clock and mathematical instrument maker, working by day and studying by night, and acquired skill, erudition and a chronic pain in his chest. While engaged in these pursuits, Thomas Barton, an

alumnus of Trinity College, Dublin, and two years older than our David, opened a school near the Rittenhouses and formed a warm friendship for the future philosopher, which finally led to a marriage with his sister Esther, two years later. Barton while at Norriton supplied David with books from which he studied Latin, Greek and science. Next Barton became a tutor in the Academy, afterwards the College of Philadelphia and now the University of Pennsylvania. Barton's means of furnishing his friend books was thus much enlarged. Indeed, the two friends established a small circulating library at Norriton. Finally, in 1754, Barton embarked for England to obtain orders and returned a year later with valuable additions for Rittenhouse's private library. At the end of another year, Rittenhouse writes Barton at Lancaster: "I have not health for a soldier. As I have no expectation of serving my country in that way I am spending my time in the old trifling manner, and am so taken with optics that I do not know whether if the enemy should invade this part of the country, as Archimedes was slain while making geometrical figures on the sand, so I should die making a telescope." Through Barton, Rittenhouse acquired the friendship of the Reverend William Smith, the brainy and energetic first Provost of the University of Pennsylvania, as well as that of John Lukens, Surveyor General, and Richard Peters, Provincial Secretary, through whom he was called upon, in 1763, to perform his first public service—one of very serious importance. It had been agreed between the Penns and Lord Baltimore that a boundary between their respective properties should be a circle of twelve miles radius drawn about the center of the town of New Castle. John Watson relates his efforts in 1850 to locate this circle and its center in harmony with the Maryland Commissioners and tells of the ingenious methods of Theodore Grew, Professor of Mathematics of the University of Philadelphia, for obtaining the point of contact of the tangent. Rittenhouse laid out this arc topographically with instruments constructed by his own hand and, alone, made a number of intricate calculations so promptly

and accurately as to receive commendation and extra compensation from both the litigants. Mason and Dixon, the English astronomers, furnished with the best instruments England could afford, accepted Rittenhouse's circle without change and ran the southern boundary of Pennsylvania until stopped by the Indians about 160 miles west, in 1766, the year of Rittenhouse's marriage to Eleanor Colston. Two years before this his father moved to another farm, giving the homestead to David. The next year, writing to the *Pennsylvania Gazette*, Rittenhouse computes that "The force wherewith a man acts when he lifts a weight of 200 pounds, if applied without interruption for the space of 105 years, is sufficient without any machinery to move the earth one inch in that time, and it must, from this velocity, received by that force alone continue for ever after to move at a rate of one inch in fifty years." The first calculator said in 27,000,000,000 years. He also reached the conclusion that water was compressible and invented the metallic thermometer, for which Breguet received much reputation a century later. This same year he communicated to Barton his first description of his orrery and on November 17, 1767, the College of Philadelphia bestowed on him the honorary degree of Master of Arts. On March 21, 1768, Provost Smith communicated, as the first paper to the Philosophical Society, a description of this orrery. In 1769 Rittenhouse was employed in settling the New York-New Jersey boundary. As early as November, 1768, he began to erect and fit an observatory at Norriton for the purpose of observing the transit of Venus, computed to occur June 3, 1769. Three committees were appointed by the American Philosophical Society; the one at Philadelphia, under John Ewing, was taken care of by the state government. Owen Biddle had Mason and Dixon's reflecting telescope at Cape Henlopen Lighthouse. Associated with Rittenhouse at Norriton, Provost Smith used a reflecting telescope, with Dollard's micrometer, sent by Thomas Penn and Mr. Masklyne, the Astronomer General at Greenwich; Mr. Lukens procured an astronomical quadrant of two and one-half

feet radius, made by Sisson, from him called Earl of Stirling, Surveyor General of East Jersey; and Rittenhouse, as was his custom, made an equal altitude instrument, a transit telescope, and a timepiece; and performed all the laborious preliminary computations. So the committee appeared June 1st to find everything in perfect adjustment.

But two men, Horrox and Crabtree, had seen the transit of 1639. That of 1761 proved disappointing to every hope. That of 1769 was to be best visible in America. A great degree of jealousy and mystery attended the preparation of the different nations,with the English blaming Lalande, who wished to assume direction. Rittenhouse seems to have maintained an admirable neutrality and to have eventually gained both Masklyne and Lalande as friends, though the very accuracy of the American calculations (the earliest made) seemed to have been at first injurious to their credit. Those who had believed themselves within 80,000,000 miles of the sun were not prepared to suddenly move 16,000,000 miles further away by the reduction of the parallax of Venus from 10 seconds to 8.6 seconds, as the American calculators made it. Rittenhouse, though self-taught, showed a nicer appreciation of the difficulties to be overcome, a truer scientific instinct than any other American observer. His computations are very accurate and his projection of the transit is superbly drawn.

Though June 1st and preceding days were overcast, with frequent heavy rains, June 2d was clear and June 3d intensely bright. Rittenhouse had computed first contact to take place at 2 o'clock, 11 minutes. So on account of the great height of the sun the observers lay down at 2 o'clock, Mr. Barton supporting Mr. Rittenhouse's head and the entire assembly pensively silent. At 2 o'clock, 11 minutes and 36 seconds Rittenhouse noted first contact and internal contact at 2 o'clock, 28 minutes, 45 seconds, and after counting seconds for 1 minute and 32 seconds found the planet fairly on the disc of the sun, and then fainted from emotion, heat and the strain of his position. Speedily recovering, he continued his observa-

tions. Some able successors, unable to understand the sensitive, resilient, enduring nature of Rittenhouse, have cast aside his whole work and that of his collaborators because of this brief loss of consciousness. Those who wish may read the interesting accounts in the first 133 pages of the first volume of the American Philosophical Society. On November 9th of the same year our astronomer observed a transit of Mercury and in the early summer of 1770 Lexell's Comet with a sextant, computing its orbit, supposing it to be parabolic. All this time he worked on his orrery, so named from a British earl who had patronized the construction of one from a pirated model. But Rittenhouse wanted to make a reliable scientific instrument, rather than to "give the ignorant in astronomy a just view of the solar system." From the center face of the orrery rose a gilded ball representing the sun. Round this the planets moved in elliptical orbits, properly inclined and so adjusted as to conform with the extant tables of astronomy for 5,000 years forward or backward. In fact, it was a mechanical astronomical table, just as a slide rule is a mechanical logarithm table. It was put in motion by turning a winch till the proper time was indicated, then with a small telescope applied to the center ball and directed to the planet its longitude and inclination were seen on the large graduated circle representing the zodiac and itself having a motion of one degree in seventy-two years, corresponding to the precession of the equinoxes. The position of the planet in regard to the earth was obtained similarly. Of the lesser faces one shows Jupiter and Saturn and their attendant satellites and the other the phenomena of the moon, "particularly the time, quantity and duration of her eclipses and those of the sun occasioned by her interposition." Clock-making was now in abeyance and only promised after harvest for ready money. About this time, so Provost Smith, then absent, explains, Rittenhouse made a sort of agreement to let his orrery go to Princeton. Smith bewails its burial in a village, yet is comforted in that it is not to be delivered till the following winter; its creator agrees to make a second which was to be finished

as soon as the first. For his love of Rittenhouse, Smith agrees. But the governor wants the first, even though the second is better. Smith gave a course of lectures to pay for the second orrery. Rev. Dr. Peters wrote, "The Doctor in his introductory lecture was honored with the principal men of all denominations, who swallowed every word he said with the pleasure that attends the eating of the choicest viands, and in the close, when he came to mention the orrery, he over-excelled his very self." The State Assembly granted Rittenhouse £300 and ordered a third or bigger one at a cost of £400. Joel Barlow in the "Vision of Columbus," 1787, alludes to the numerous resort of persons to the college hall for the purpose of viewing the orrery as follows:

> See the sage Rittenhouse, with ardent eye,
> Lift the long tube and pierce the starry sky;
> Clear in his view the circling systems roll,
> And broader splendours gild the central pole.
> He marks what laws th' eccentric wand'rers bind,
> Copies Creation in his forming mind,
> And bids, beneath his hand, in semblance rise,
> With mimic orbs, the labours of the skies.
> There wand'ring crowds with raptur'd eye behold
> The spangled Heav'ns their mystic maze unfold;
> While each glad sage his splendid Hall shall grace,
> With all the spheres that cleave th' ethereal space.

It is curious that just such another incident occurred in the case of West's painting, "Christ Healing the Sick," when gentle Philadelphia again received not a copy, but a revision, "corrected and amended by the author." One can hardly understand today the tremendous reputation these orreries gave Rittenhouse, both in Colonial America and abroad. They even entered diplomacy and during the war the soldiers took an active interest in the intricate mechanism, and globes and wheels were prized as souvenirs. After Rittenhouse's death Henry Voight, the first coiner of the United States Mint, repaired both orreries, but, alas! the souvenir hunters have been busy again.

Instead of the original two, there are barely two-thirds of one—the Princeton orrery seems to have entirely vanished. At one time the orrery was reproduced on the corporate seal of the trustees of the University of Pennsylvania.

About this time Dr. Smith and other friends persuaded Rittenhouse to move to Philadelphia, with the prospect of a salary of £200 and better chances in his business. The promised sinecure failed on account of a point of etiquette. Mr. Rittenhouse made other arrangements and came to this city, where he soon lost his wife. In 1771 the first volume of the American Philosophical Society was published; Rittenhouse became one of the secretaries and, with Kinnersly, was much interested in the electric eel. In 1772 we find him, for the only time, really melancholy, irritable and unsettled whether to go to England or not. His saucy little niece accuses him of being in love and Barton wishes him success or a "happy delivery from the effects of love." That same year he married Hannah Jacobs and his mind speedily recovered its tone. In 1773 he was one of a commission to make the Schuylkill navigable, and in 1774 to run a boundary between Pennsylvania and New York. This same year he became keeper of the State House clock and member of the Mechanics Committee.

On February 24, 1775, David Rittenhouse delivered "in a feeble voice," "listened to with profound attention," an oration before the American Philosophical Society, in which, after tracing the history and meaning of astronomy, he speculates on the inhabitants of other planets. He rejoices that these people cannot be reached by British thirst of gain, German tyranny, or American social distinction founded on reflection and absorbtion of material rather than spiritual light. Later he enumerates "a few of the many things that are still left to the industry of the ingenious in this science." With gentle and unfaltering trust he remarks "Should it please Him to indulge us with existence throughout that half of eternity which still remains unspent; and to conduct us through the several stages of his works; here is ample provision made for employing every

faculty of the human mind, even allowing its powers to be constantly enlarged through an endless repetition of ages . . . happy in a continual approach to the Deity."

This same year the Philosophical Society prayed the Colonial legislature to establish a public observatory, doubtless under the care of Rittenhouse. Could his genius have had leisure, what might not have developed! Fate determined that Lexington and Concord should come a month later and Rittenhouse is ordered to prepare molds for iron clock-weights that may replace leaden ones, to survey the Delaware to ascertain where best to fortify, to arrange an engineer of the committee of safety for testing and rifling cannon, to devise a chain across the river. As vice-president of the committee he issued proclamations. He succeeded Franklin as a member of the Assembly in 1776. He was a member of the first Constitutional Convention of Pennsylvania, a member of the Board of War and of the Council of Safety,—the only body in the country ever endowed by the people with absolute power of life and death. A list of dangerous persons was made out, including Rev. Dr. Smith, upon whom it is interesting to note no return was made. Rittenhouse was State Treasurer of Pennsylvania from 1777 to 1789, living during the occupation of Philadelphia with Mr. Henry at Lancaster. It will be noted that even in his business letters he is still the investigator and is eager for contributions from others. Jefferson protested against his wasting his abilities on affairs of state. The Royalist party was also reluctant, as witness the *Royal Gazette*, 1779:

> There dwelt in Norriton's sequestered bowers,
> A mortal blessed with mathematic powers,—
> To whom was David Rittenhouse unknown?
> Fair Science saw and marked him for her own.
> His eye creation to its bounds would trace,
> His mind the regions of unbounded space.
> While thus he soared above the starry spheres,
> The word of Congress sounded in his ears;
> He listened to the voice with strange delight
> And swift descended from his dazzling height,

Yet from 1780 to 1796 he published seventeen papers on optics, magnetism, electricity, meteors, logarithms, astronomical observations, etc. He, Smith, Lukens and Biddle observed the transit of Mercury and two eclipses of the sun in 1776, 1777 and 1778 and a week after the evacuation he was in the city seated at his telescope watching an eclipse. In 1781 the Assembly granted him £250 for an observatory at his residence, northwest corner of Seventh and Arch Streets. In 1782 he was given his M.A. at Princeton and was made a fellow of the Academy of Arts and Science of Boston, and invented a wooden hygrometer. In 1779 he helped extend Mason and Dixon's line to the western boundary of Pennsylvania and was Professor of Astronomy and Vice-Provost of the University of Pennsylvania, at a salary of £400 from 1779 to 1782, and trustee afterward. In 1784 he was making astronomical observations at Wilmington and received another special M.A. from William and Mary College. In 1785 he was again commissioner on the western boundary of the state. His letters to his wife, who was a competent business woman and took care of his treasurer's books, are most human and interesting. This same year he made the beautiful invention of the collimating telescope and first used the spider's thread for a cross hair in his telescope. In 1786 the second volume of the Philosophical Society appeared, containing seven articles by Rittenhouse. He was engaged on the boundary between New York and Massachusetts in 1787. Princeton made him a Doctor of Laws in 1789. He translated this same year Lessing's "Lucy Sampson, or The Unhappy Heiress," published anonymously, and also "Idylls of Gesner." He observed the transit of Mercury in 1787, two lunar eclipses in 1789 and 1790 and two solar eclipses in 1790 and 1791. In 1790 he was elected vice-president of the Philosophical Society and later president, at the death of Franklin, 1791. Franklin's death was communicated by messenger to Thomas McKean, Henry Hill, Thomas Willing, David Rittenhouse and Dr. William Smith, who were dining with Governor Thomas

Mifflin at the Falls of Schuylkill. A fierce thunderstorm was raging at the time and Smith wrote impromptu:

> Cease, cease, ye clouds, your elemental strife!
> Why rage ye thus, as if to threaten life?
> Seek, seek no more to shake our souls with dread!
> What busy mortal told you Franklin's dead?
> What though he yields at Jove's imperious nod?
> With Rittenhouse he left his magic rod!

He was on various commissions of waterways, turnpikes, etc., in 1791 and following years, and was appointed, April 4, 1792, the first director of the United States Mint, which he constructed, equipped and made efficient and economical, sometimes at his own expense. The site of this building was at 37–39 North Seventh Street, now occupied by Frank H. Stewart, a most patriotic electrician. In 1793, as president of the Philadelphia Democratic Society, Rittenhouse was subject frequently to adverse criticism, owing much of it to the indiscretion of Genet, the French Minister. Dr. Rittenhouse left the Mint in 1795, the year he was elected a foreign member of the Royal Society of London. This same year Ceracchi executed a bust of the philosopher. For some months before his death Dr. Rittenhouse was strongly impressed with the idea that his career of usefulness and virtue was nearly at an end. During his last illness of only four days, told by his wife that friends had inquired, he asked why he had not seen them. "Because," said his wife, "you are too weak to speak to them." "Yes," he said, "but I could still have squeezed their hands." When his attending physician, his nephew, Benjamin Smith Barton, asked him, June 26, 1796, shortly before he expired, if he felt easier, he replied, "Yes, you have made the way to God easier."

So they buried him under the only observatory in America known to the eminent French astronomer Lalande. And Dr. Benjamin Rush pronounced "an eloquent, learned, compre-

hensive and just eulogium" at the First Presbyterian Church, December 17, 1796, before the President, Senate and House of Representatives of the United States, the Senate and House of Representatives of Pennsylvania, foreign ministers, consuls, Secretaries of the General Government, the Judges of the Courts of the United States and of Pennsylvania, the corporation and clergy of the City of Philadelphia, the College of Physicians, the Trustees, Faculty and students of Philosophy and Medicine in the University" together with other invited guests of the Philosophical Society. But they would not let him rest and moved him down to Old Pine Street Presbyterian Churchyard, where he lay until January 18, 1878, when they moved his tired body to North Laurel Hill Cemetery, where we trust it has found a lasting abiding place.

While Rittenhouse was treasurer, in 1778, Gideon Olmsted, a Connecticut fisherman, and three associates were captured on the open sea near Cape Charles, taken to Jamaica and forced to help navigate the sloop "Active" to New York with a cargo of arms and supplies for the British army. One night Olmsted and his companions drove the captain, passengers and rest of the crew below and steered for Little Egg Harbor. The captives found arms and powder, and melting pewter spoons for bullets, swept the deck. Olmsted, though wounded, trained a heavy swivel gun down the companion-way, and, driven back, the captives wedged the rudder till hunger and thirst compelled submission. Just at the hour of victory, while in full sight of land, Olmsted was captured by the Pennsylvania brig "Convention," which was joined later by the American privateer "La Gerard," and they both claimed Olmsted's company not sufficient to make a capture. In the Admiralty court Olmsted got only one-fourth of the prize, so he appealed and Benedict Arnold took another chance and went his security. The Congressional Court of Commission in Appeals reversed the decision September 15, 1778, giving all to Olmsted. Ross, the former judge, got possession of the money and defied the weak Federal

judiciary. Congress passed powerless resolutions and the Pennsylvania Assembly authorized Judge Ross to pay the prize money to David Rittenhouse, the State Treasurer. In 1792 the Supreme Court of Pennsylvania again declared against the determined Olmsted. In 1803 the United States District Court issued a decree against the two widowed and defenseless daughters of Rittenhouse, directing them to hand over the certificate of the funds. Immediately the Pennsylvania legislature passed an act requiring the ladies to pay over the certificate to the State Treasurer. At this period there was a truce for five years, when Chief Justice Marshall, the strong man, came on the scene and issued a mandamus, but the United States officer was confronted by the fixed bayonets of state troops protecting the so-called Fort Rittenhouse. He retired as gracefully as he could and summoned a posse-comitatus of a thousand men and after one futile attempt, executed a flank movement and captured the two frightened ladies. Then the governor paid over the money which people somehow believed Rittenhouse had embezzled, whereas he, or rather, his innocent daughters, merely got caught between old states rights and growing Federal power. Says Hampton Carson: "The fisherman had triumphed. His pertinacity in maintaining his legal rights had equaled his persistent valor, when gashed and bleeding upon the sea, in securing his prize against superior numbers. Born in 1748, and dying at the age of ninety-eight in 1846, at East Hartford, Conn., he lived for many years after his legal victory to enjoy his reward. But better and more lasting than the fruits of heroism was the vindication of national power. The priceless principle had been established that the Constitution and laws of the United States shall be recognized as the supreme law of the land, and the judges in every state shall be bound thereby, anything in the constitution or laws of any state to the contrary notwithstanding."

So this poor gentle old philosopher's body and memory for years held no abiding place in the minds of a careless and forgetful people, till in 1884 a meridian stone was erected at

Norristown. Now the old paper-mill is gone and the place of his birth is a busy entrance to the park and Mr. Justice and the Park Commission are calling him back to his forefather's land to quiet the restless traffic and remind us all of Pennsylvania's forgotten greatest son.

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